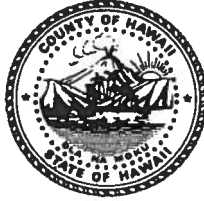


William P. Kenoi  
Mayor



JAN 08 2011

Nancy E. Crawford  
Director

Deanna S. Sako  
Deputy Director

Kenneth J. Van Bergen  
Property Manager

## County of Hawaii

RECEIVED

Finance Department  
25 Aupuni Street, Suite 1101 • Hilo, Hawaii 96720  
(808) 961-8234 • Fax (808) 961-8248

DEC 29 P2:12

REC. OF ENVIRONMENTAL  
QUALITY CONTROL

December 21, 2010

Director  
Office of Environmental Quality Control  
235 S. Beretania Street, Suite 702  
Honolulu, HI 96813

**SUBJECT: DRAFT ENVIRONMENTAL ASSESSMENT FOR SALE OF COUNTY LANDS -  
KAPULENA, HÄMÄKUA DISTRICT, HAWAII, TMK: (3) 4-7-005:001,  
002 & 003, (3) 4-7-006:001, 005, 006, 007, 010, 018 & 020**

Dear Director,

The Hawaii County, Department of Finance has reviewed the Draft Environmental Assessment for the subject project and anticipates a Finding of No Significant Impact (FONSI) determination. Please publish notice of availability for this project in the next OEQC Environmental Notice.

We have enclosed a completed OEQC Publication Form, one copy of the document in pdf format, one copy of the Draft EA, and the project summary on disk. Please call Ken Van Bergen of the Hawaii County Department of Finance at 961-8009 or Catie Fernandez at PBR HAWAII at 521-5631 if you have any questions.

Sincerely,

A handwritten signature in blue ink that reads "Nancy E. Crawford".

Nancy Crawford  
Director

cc:



# { KAPULENA }

AGRICULTURAL PARK

*Draft Environmental Assessment*

Prepared for:  
County of Hawai'i  
Department of Finance

Prepared by:



December 2010



## PROJECT PROFILE

|  |   |
|--|---|
| <b>Project Name:</b>                                     | Kapulena Agricultural Park  |
| <b>Location:</b>   | Kapulena, Hāmākua District, Hawai‘i<br>TMK: (3) 4-7-005:001, 002 & 003<br>(3) 4-7-006:001, 005, 006, 007, 010, 018, 020   |
| <b>Landowner:</b>  | County of Hawai‘i   |
| <b>Proposing Agency:</b>                                 | County of Hawai‘i, Department of Finance  |
| <b>Accepting Authority:</b>                              | Mayor or designee, County of Hawai‘i  |
| <b>Existing Use:</b>                                     | Fallow former sugarcane land overgrown with Guinea grass, ironwood trees, and other invasive weeds  |
| <b>Proposed Action:</b>                                  | Development and lease (or permit) of County lands as an agricultural park   |
| <b>Land Use Designations:</b>                            |   |
| State Land Use District:                                 | Agriculture   |
| Hawai‘i County Zoning:                                   | A-40a   |
| County General Plan:                                     | Important Agricultural Lands  |
| <b>Alternatives Considered:</b>                          | Hawai‘i County has considered four alternatives: no action, selling, exchanging, or leasing. Based on the lack of response to the Pa‘auilo land sales, selling is not a viable alternative at this time. In lieu of selling or exchanging, the County has decided to forego generating revenues as a primary objective and instead to use this County asset to pursue community objectives in terms of promoting agriculture.   |
| <b>Summary of Major Impacts and Mitigation Measures:</b> | The endangered Hawaiian Hoary Bat has been detected at this site. However, due to the proposed activity and the transient nature of the bat, negative impacts to this species’ habitat is not expected and no mitigation is proposed. One archaeological feature at this site is proposed to be avoided by any new activity. The feature may be the remnants of a heiau or the feature may also be a historic sugarcane structure used for the loading or processing cane. This feature is recommended to be avoided until additional archaeological testing can be accomplished to ascertain its origins. Based on soil characteristics, topography, and rainfall, the site is suitable for agriculture, but not as suitable in the upper portion of |

KAPULENA AGRICULTURAL PARK  
DRAFT ENVIRONMENTAL ASSESSMENT

the site where the topography is steeper (where the ALISH designation is Unclassified, i.e., not Prime or Other). The site is within the service area of the Hāmākua Ditch, and alternative surface or groundwater sources for irrigation may be developed to serve mauka portions of the site. Altering the land contours for agricultural use could affect the drainage onto the downstream owners, but this can be mitigated by developing conservation plans as required by the County's grading ordinance. Any educational facilities associated with the agricultural use would be allowed to install cesspools that meet the Department of Health's standards since the site is located in a non-critical wastewater disposal area where any cesspool leachate would not impact the groundwater or nearshore coastal waters. The site is not in any special natural hazard area.

**Anticipated  
Determination:**

Finding of No Significant Impact (FONSI)



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## **1.0 INTRODUCTION**

### **1.1 PROPOSING AGENCY**

In accordance with Section 343-5(b), *Hawai'i Revised Statutes* (HRS), whenever an agency proposes the use of County land or funds, that agency shall prepare an Environmental Assessment for the action at the earliest practicable time to determine whether an Environmental Impact Statement shall be required.

In order to comply with Chapter 343, HRS, the County Department of Finance (DOF) has contracted PBR HAWAII to prepare and process this environmental assessment. The County DOF is the proposing agency for this project; the mailing address and primary contact person is listed below:

Ms. Nancy Crawford, Director  
County of Hawai'i  
Department of Finance  
25 Aupuni Street, Suite 2103  
Hilo, Hawai'i 96720-4252

### **1.2 BACKGROUND**

The County of Hawai'i is the landowner of the subject property and is the agency preparing this environmental assessment. The 10 parcels covered by this EA were acquired from Hāmākua Sugar in 1994 in a settlement of taxes owed to the County of Hawai'i. Prior to the County's acquisition, the property had been in active sugar cane production. In the intervening years, the County of Hawai'i has not developed or used the properties beyond performing basic maintenance. The County had considered selling these lands to generate revenue to help meet budget shortfalls. In response to community comments, the County has reconsidered and has worked with various partners to evolve the proposed agricultural park described in more detail in Section 2.0 of this assessment.

### **1.3 DESCRIPTION OF THE PROPERTY**

The property, totaling approximately 1,739.807 acres, is located in the Hāmākua District on the northeast side of the Island of Hawai'i ("Kapulena Lands"). The Kapulena Lands lie mauka of Honoka'a-Waipio Road (Highway 240) roughly half way between Honoka'a and Waipi'o Valley (Figure 1). The Kapulena Lands consist of ten (10) parcels (tax map keys (TMK) 3<sup>rd</sup>/4-7-005:001, 002, 003; 4-7-006:001, 005, 006, 007, 010, 018, 020), and spans across several ahupua'a (see Figure 2).

Within those ten (10) parcels there are a number of grants, Land Court Awards and a Mahele Award. There are nine (9) underlying grants and two Land Court Awards on TMK 4-7-005:001. There are two (2) grants on 4-7-005:002. There is a portion of two grants on 4-7-006:006. 4-7-006:018 is comprised of a portion of three grants, a portion of one Land Court Award and one Mahele Award. 4-7-006:010 is comprised of two grants, the portions of three additional grants and one Land Court Award. Finally, there is an underlying grant on 4-7-005:003, 4-7-006:005

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and 4-7-006:020. Pursuant to the criteria and procedures relating to pre-existing lots set forth in the Subdivision Code, Article 11 (Hawai‘i County Code section 23-117 through 23-120), the County of Hawai‘i Planning Department determined that there 32 pre-existing lots of record within these 10 parcels (see table below and Appendix A). This determination enables a consolidation and resubdivision of the Kapulena Lands into 32 lots without meeting the minimum lot size or infrastructure improvement requirements of the zoning and subdivision codes (Hawai‘i County Code §§25-2-11 and 23-7).

**Table 1. Kapulena TMKs and Lots of Record**

| <b>TMK</b> | <b>Lots of Record</b>   | <b>Owner</b>                               | <b>Tax Acres</b> |
|------------|---|--|------------------|
| 347005001  | <u>Grants:</u> 1883,<br>1768, 1770,<br>1764, (por) 1564,<br>(por) 1765, (por)<br>791, (por) 868,<br>(por) 670<br><u>LCA:</u> (por)<br>9971:4, (por)<br>9971:8 | County of Hawai‘i                          | 777.940          |
| 347005002  | <u>Grants:</u> (por)<br>1882, (por) 1776  | County of Hawai‘i                          | 38.570           |
| 347005003  | <u>Grant:</u> (por) 1882  | County of Hawai‘i                          | 1.430            |
| 347006001  | <u>Grant:</u> (por) 2449<br><u>LCA:</u> (por) 9971:2  | County of Hawai‘i                          | 214.000          |
| 347006005  | <u>Grant:</u> (por) 2123  | County of Hawai‘i                          | 81.400           |
| 347006006  | <u>Grant:</u> (por) 2124,<br>(por) 670  | County of Hawai‘i                          | 167.700          |
| 347006007  | (por) 2124  | County of Hawai‘i                          | 61.250           |
| 347006018  | (por) 4003, (por)<br>2123, (por) 2449,<br><u>LCA:</u> (por) 9971:<br>2, <u>Mahele AW</u> 4-<br>B  | County of Hawai‘i                          | 227.284          |
| 347006010  | <u>Grants:</u> 1763,<br>1767, (por) 1564,<br>(por) 1765, (por)<br>791<br><u>LCA:</u> 9971:4   | County of Hawai‘i                          | 164.850          |
| 347006020  | <u>Grant:</u> (por) 4012  | County of Hawai‘i                          | 5.383            |
|            |   | <b>Total Acreage</b>                       | 1,739.807        |
|            |   | <b>No. Tax Map Lots</b>                    | 10               |
|            |   | <b>No. Pre-Existing<br/>Lots of Record</b> | 32               |



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DRAFT ENVIRONMENTAL ASSESSMENT

The primary access to the Kapulena Lands from Highway 240 is by “Quarry Road”, a paved former cane road maintained by the County. The portion of this road not on County-owned lands is privately owned by Kamehameha Schools (TMK 4-6-5:001 and 4-6-4:007). The County recently obtained an easement from Kamehameha Schools to establish legal rights to use this road through Kamehameha School’s property. The portion of the easement that is not a subdivided roadway lot is defined by metes and bounds. This cane road connects to Mud Lane, an unimproved government road. The County obtained easements from Kamehameha Schools and another private owner, Mauka-Makai Corp., to enable access to Mud Lane. Two unpaved mauka-makai roads (former cane haul roads) connecting Honoka‘a-Waipio Road to the quarry road also provide access through the site.

The lands are fallow, formerly cultivated in sugar cane, and are now vegetated primarily by common ironwood trees and Guinea grass. A County rock quarry is located on TMK 4-7-006:005.

*Unpaved cane haul road*



*Access road to County rock quarry from paved cane haul road*



## 1.4 SURROUNDING LAND USES

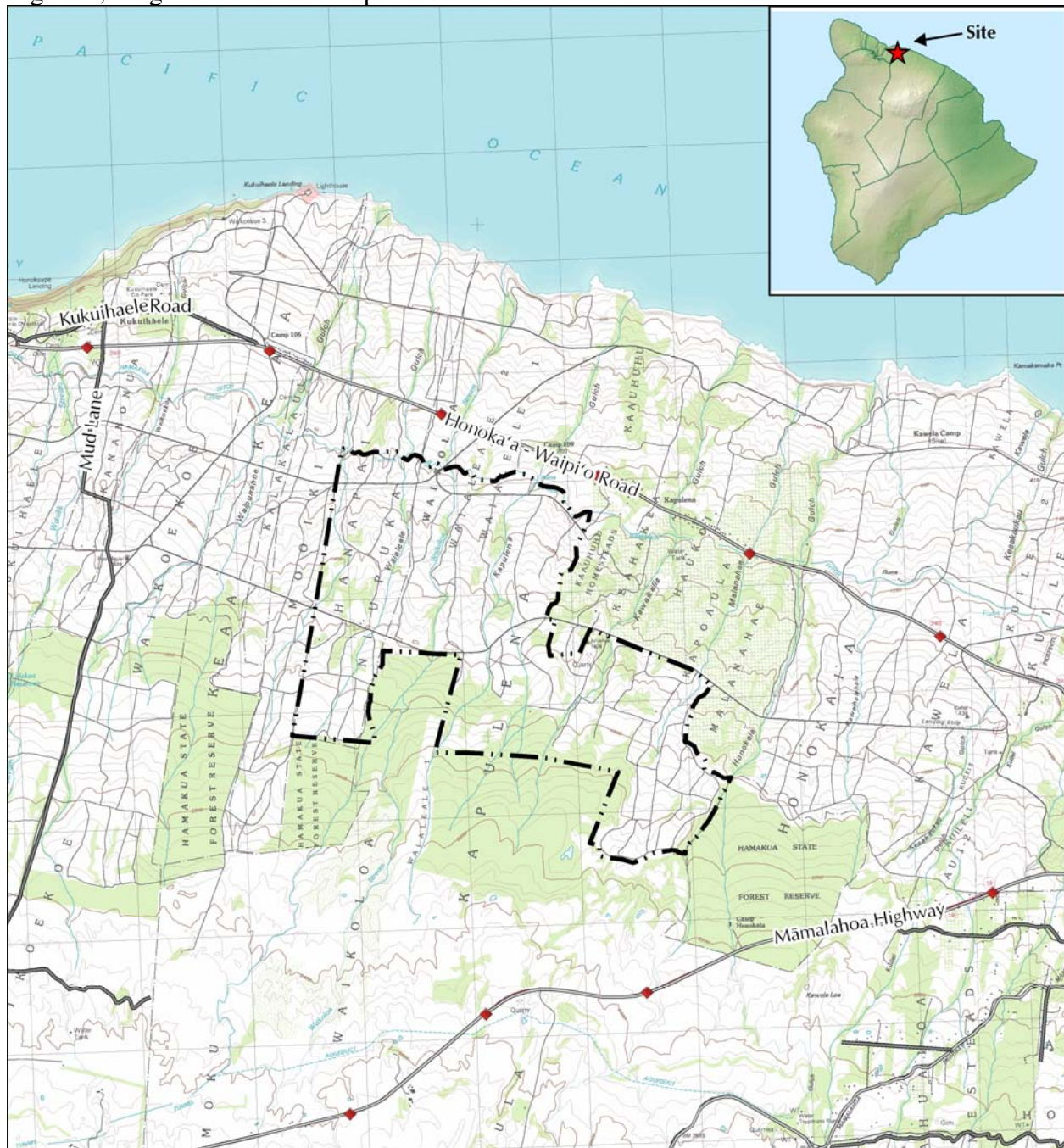
Surrounding land owners and uses include (see Figure 3):

- North (makai). The Lower Hāmākua Ditch defines a portion of the Kapulena Lands northern boundary. Kamehameha Schools owns the land between the Ditch and Highway 240. The neighbors along the remaining portion of the northern boundary are several private owners whose lands are primarily in pasture or orchards. Along the highway is a cluster of homes called Kapulena.
- South (mauka). The State of Hawai‘i (Hāmākua Forest Reserves), Department of Hawaiian Home Lands, Boy Scouts of America Aloha Council, and a private owner are the neighbors to the south between the Kapulena Lands and the Hawai‘i Belt Road (Highway 19).
- East (towards Waimea). The neighbor to the east is a private owner (Mauka-Makai Corp.) whose land is currently used as pasture.
- West (towards Honoka‘a). The neighbors to the west are several private owners including Kamehameha Schools.



# KAPULENA AGRICULTURAL PARK DRAFT ENVIRONMENTAL ASSESSMENT

Figure 1, Regional Location Map



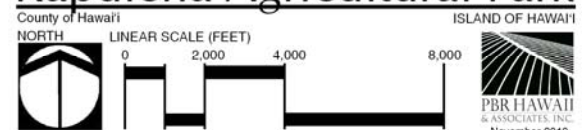
**LEGEND**

- Kapulena
- Roads
- ◆ Mile Marker

Source: U.S. Geological Survey  
Disclaimer: This graphic has been prepared for general planning purposes only.

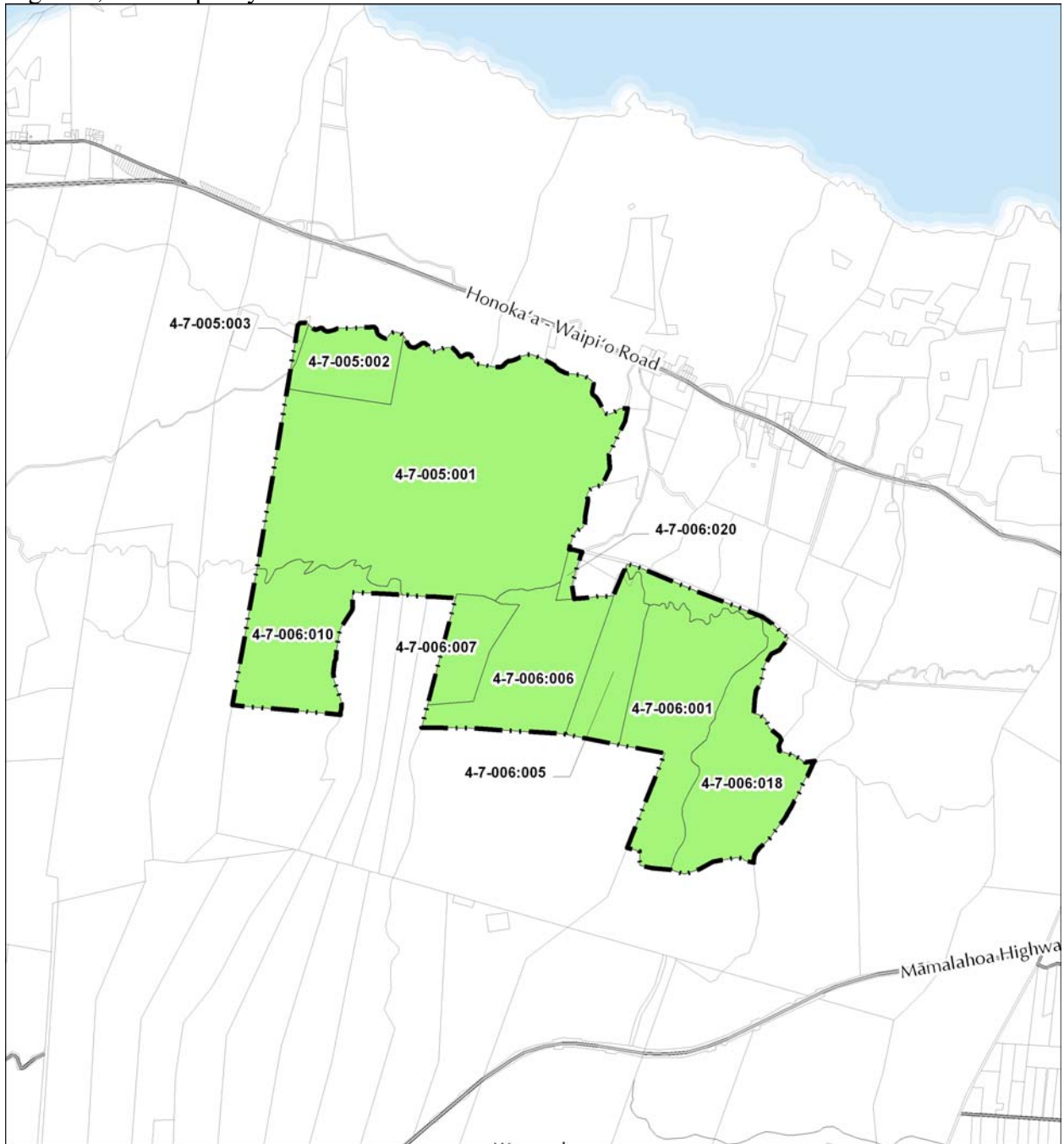
Regional Location

**Kapulena Agricultural Park**






# KAPULENA AGRICULTURAL PARK DRAFT ENVIRONMENTAL ASSESSMENT

Figure 2, Tax Map Key

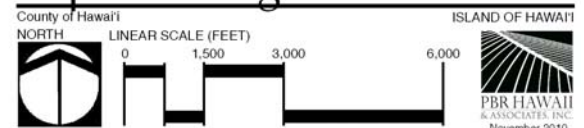


## LEGEND

-  Kapulena
-  Roads
-  Kapulena Parcels

## Tax Map Key Parcels

## Kapulena Agricultural Park

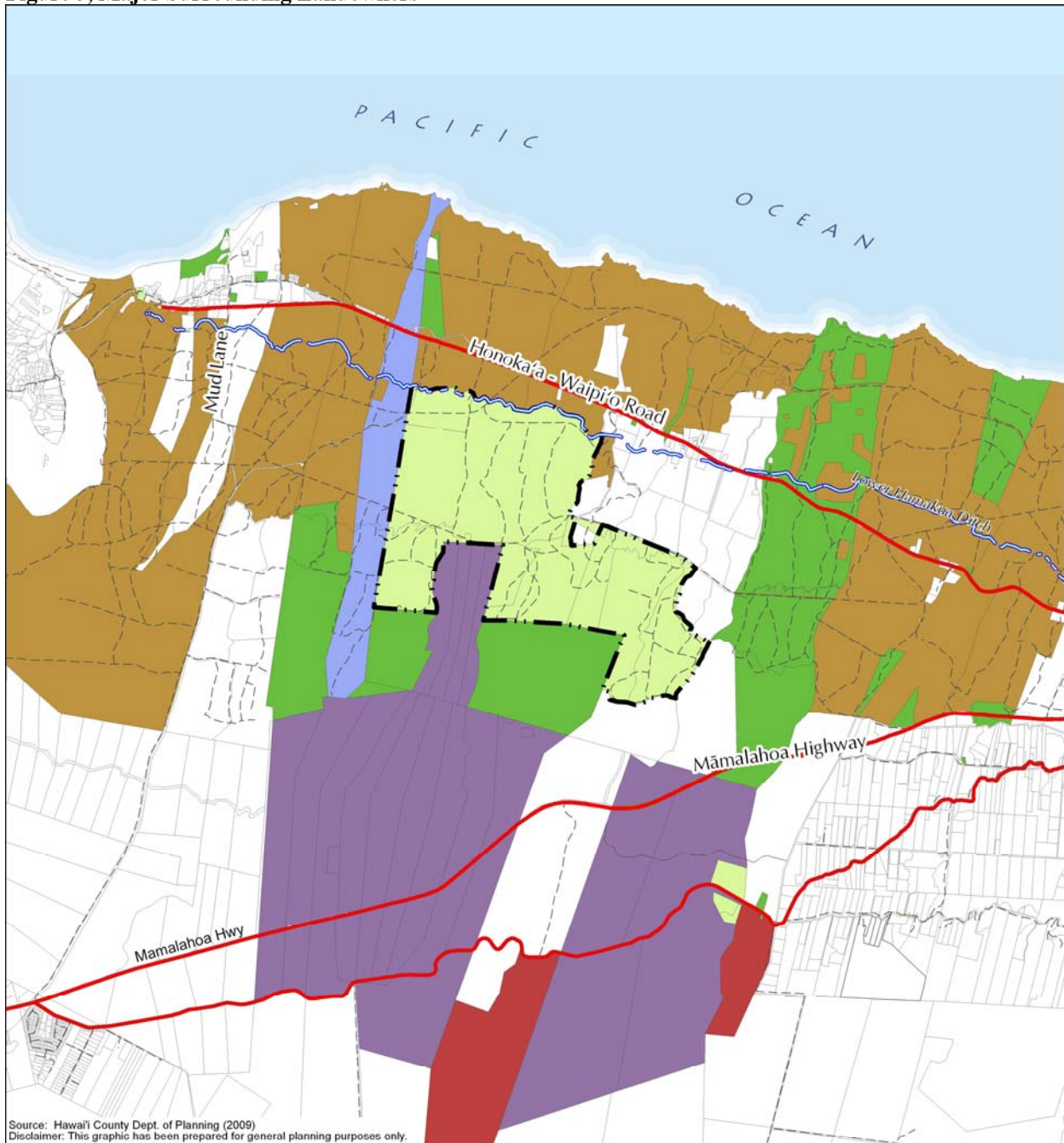


Source: Hawai'i County Tax Assessor Parcel Data (2008)  
Disclaimer: This graphic has been prepared for general planning purposes only.



# KAPULENA AGRICULTURAL PARK DRAFT ENVIRONMENTAL ASSESSMENT

**Figure 3, Major Surrounding Landowners**

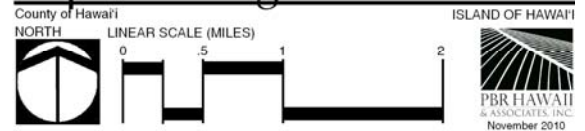


## LEGEND

- Kapulena Site
- Major Roads
- Other Roads
- Lower Hamakua - Ditches
- Major Landowner**
  - Govt. County of Hawai'i
  - Govt. State
  - Govt. State DHHL
  - Mauka-Makai
  - Parker Ranch
  - Kamehameha Schools
  - Other

Surrounding Landowners

## Kapulena Agricultural Park



KAPULENA AGRICULTURAL PARK  
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## **2.0 PROJECT DESCRIPTION**

### **2.1 PROJECT GOALS AND OBJECTIVES**

The Hawai'i County Department of Finance (DOF) proposes to permit or lease the subject property for agricultural use as an agricultural park. The agricultural park will allow these lands to be put back into productive agricultural use. The lease rents (or permit fees) will be nominal and therefore not expected to be a major general fund revenue source. However, the County views the promotion of agriculture rather than income will serve the greater public interest in furtherance of sustainability goals.

### **2.2 NEED FOR THE PROJECT**

The County has owned the Kapulena Lands since 1994, when it was acquired from Hāmākua Sugar Company in lieu of real property taxes owed. Although the County had considered selling the Kapulena Lands to offset budget shortfalls, community interest in using the land for diversified agriculture prompted the County to consider other plans for the property. The County met with experts in agriculture from State and Federal Agencies and forged a partnership with the Hāmākua Farm Bureau, the Big Island Farm Bureau, Kamehameha Schools, the University of Hawai'i College of Agriculture and Forestry, the University of Hawai'i College of Tropical Agriculture and Human Resources, and The Kohala Center to develop the agricultural park concept described in the Proposed Use section below. The agricultural park concept addresses the following needs:

- To develop and demonstrate best practices for sustainable and efficient grazing operations to support the grass-fed beef industry;
- To test alternative orchard and other crops for larger scale production;
- To test and provide incubator opportunities for value-added products;
- To train farmers and processors in cultivation and business practices at different scales from family to larger-scale operations, with an emphasis to strengthen the family-farm based agricultural community in Hāmākua.

The County recognizes that agriculture in the Hāmākua District has diversified to include cattle ranching, production of macadamia nut, fruit trees, vegetables, flowers, aquaculture and forestry. The diversification of the industry has lead to a growth in the total number of agricultural operations, but an overall loss in acreage utilized for farming and ranching. Thus, improving best practices, providing an area to risk new product development, providing training opportunities, and providing low cost start-up land suitable for agricultural pursuits are ways the County can contribute to promote agriculture.

### **2.3 PROPOSED USE**

The proposed agricultural park plan will proceed in the following steps:

- 1) The County will clear the existing cane roads through the Kapulena Lands and install fencing along the roads to create paddocks (see Figure 4 Agricultural Park);
- 2) Initial grazing activities under a cooperative pilot project with the Hāmākua Farm Bureau will take place on about 100 acres in the makai portion of the lands between the Lower

KAPULENA AGRICULTURAL PARK  
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Hāmākua Ditch and approximately the 1,300-foot elevation (portion of TMK 3-4-7-005:001) to clear the area of the overgrown non-native grasses. Selective removal of ironwood trees may be required to clear land for grazing;

- 3) After an initial period of grazing activities, these makai lands generally below the 1,300-foot elevation will be made available for more intensive agricultural production activities, and will be divided up into one- to five-acre sites for use in public or private agricultural operations. Cattle will be moved off of these makai lands as the more intensive agricultural demand for these lands warrant.
- 4) For the balance of the lands in the mauka portion above the 1,300-foot elevation, initial grazing activities under the cooperative pilot project with the Hāmākua Farm Bureau will take place on approximately 300 acres between the County of Hawai'i's quarry operation and the 2,000-foot elevation (portion of TMK 3-4-7-006:018 and 3-4-7-006:001);
- 5) Grazing will be expanded into additional areas of the Kapulena Lands under a permit from the County to the Hāmākua Farm Bureau or through other permits or leases as the lands are prepared and infrastructure becomes available. Long term, the mauka lands generally above the 1,300-foot elevation will be used to establish and operate a cooperative project to demonstrate best practices for increasing the per-acre production of grass-fed beef. This project may also include silviculture activities to demonstrate business models that combine silviculture and pasture activities. Expanding the grazing operations will necessitate removal of the ironwood forest in phases under the supervision of the Natural Resources Conservation Service and the Hāmākua Soil and Water Conservation District.
- 6) The educational component of the project will include a partnership with the Center for Agricultural Success (CACS), a new entity being planned by the University of Hawai'i College of Agriculture and Forestry. The center will conduct training on both the Kapulena Lands and in classroom space elsewhere. The facilities required to be developed for CACS' educational purposes will be located on the makai portion of the site below the 1,300-foot elevation. Educational facilities will include sheds to accommodate a facility for converting ironwood trees into bio-charcoal; a charcoal oven and related equipment; a shop and drying shed for wood; a still to make alcohol; an office; and a clearing-house facility for processing produce.

The infrastructure improvements to support this plan include:

- Fencing;
- Clearing and surface treatment of existing roads to agricultural standards;
- Installation of pumping equipment to access water from the Lower Hāmākua Ditch for operations at the lower elevations;
- Water source development such as a well, reservoir or large-scale water catchment systems at higher elevations.

All of the above improvements are anticipated to occur onsite. This EA does not cover any offsite improvements. The County will not permit any farm dwellings.

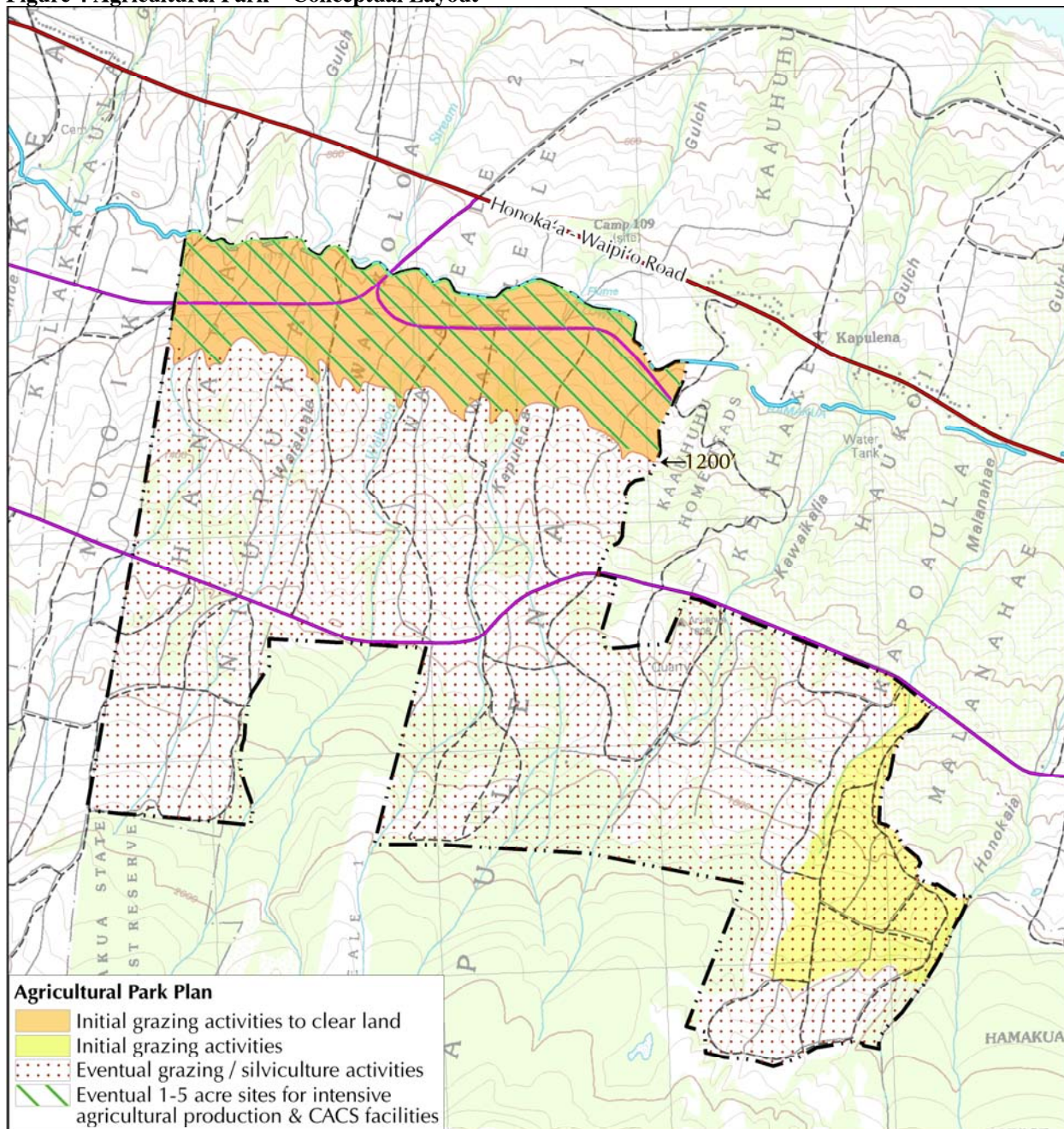
## **2.4 PHASING AND TIMING OF ACTION**

Fencing and clearing of existing roads will occur immediately. The initial pilot grazing project is planned to commence in early 2011. The installation of infrastructure, expanded agricultural use, and the construction of the training facility will phase in over a projected 10-year period.



# KAPULENA AGRICULTURAL PARK DRAFT ENVIRONMENTAL ASSESSMENT

**Figure 4 Agricultural Park – Conceptual Layout**

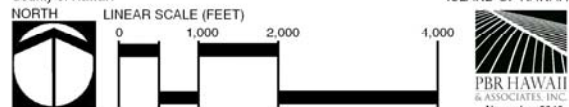


Source: U.S. Geological Survey  
Disclaimer: This graphic has been prepared for general planning purposes only.

Agricultural Park - Conceptual Layout

## Kapulena Agricultural Park

County of Hawai'i ISLAND OF HAWAII



KAPULENA AGRICULTURAL PARK  
DRAFT ENVIRONMENTAL ASSESSMENT

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### **3.0 ASSESSMENT OF THE NATURAL ENVIRONMENT, POTENTIAL IMPACTS AND MITIGATION MEASURES**

This chapter describes the existing natural environment of the Kapulena Lands and potential impacts that may result from the proposed agricultural park. The chapter also describes mitigation measures to address potential impacts.

#### **3.1 CLIMATE**

Because the project site lies between the 1,000 and 2,000-foot ground elevation on the northeast side of Hawai'i Island, it is affected by the prevailing northeast trade winds, making the climate there cool and wet. Winds are generally northeast, with typical trade wind speeds of 10 to 15 miles per hour.

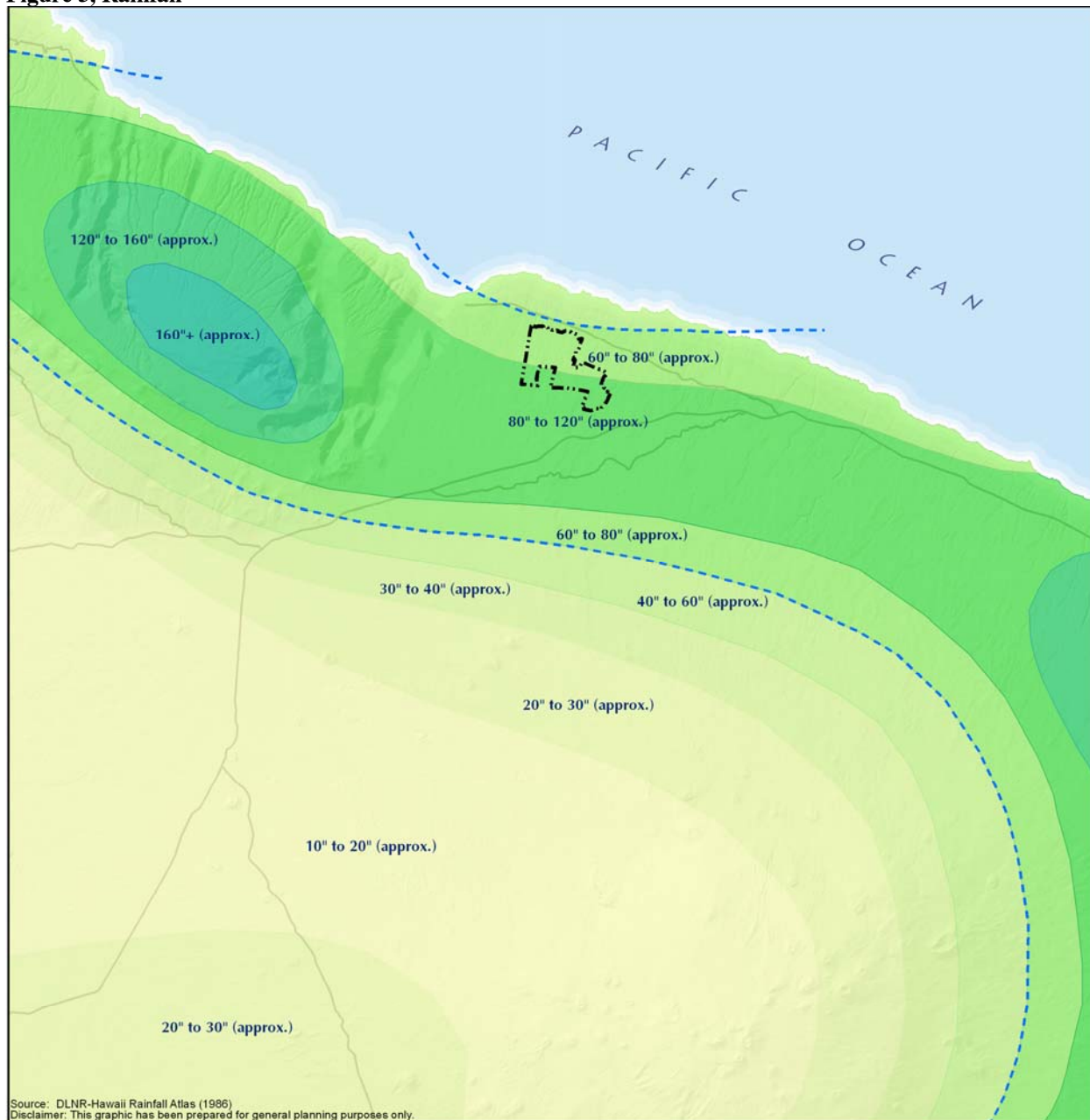
Average annual rainfall in the general vicinity of the project site is approximately 70 inches (see Figure 5). The average temperature ranges between 71 and 76 degrees Fahrenheit.

#### ***Potential Impacts and Mitigation Measures***

The climate is suitable for the proposed agricultural uses.

# KAPULENA AGRICULTURAL PARK DRAFT ENVIRONMENTAL ASSESSMENT

**Figure 5, Rainfall**



## LEGEND

Kapulena

### Rainfall (inches)

~ 60 inches

10" to 20" (approx.)

20" to 30" (approx.)

30" to 40" (approx.)

40" to 60" (approx.)

Up to 60" (approx.)

60" to 80" (approx.)

80" to 120" (approx.)

120" to 160" (approx.)

160"+ (approx.)

160" to 200" (approx.)

200" to 240" (approx.)

Median Annual Rainfall

**Kapulena Agricultural Park**

County of Hawai'i

NORTH



LINEAR SCALE (FEET)



ISLAND OF HAWAII



### **3.2 TOPOGRAPHY AND GEOLOGY**

Hawai‘i Island consists of a group of shield volcanoes that make up a small part of an extensive chain of volcanoes reaching across the mid-Pacific. The Kapulena Lands are located on the northeast side of the island on the northwest flank of Mauna Kea. The land between the several gulches that traverse the site slope at an average of 6 to 12% in the lower elevations of the site, and 10 to 20% at the upper elevations. Soils within the project area derive from Mauna Kea Holocene and Pleistocene era volcanic rocks (Wolfe and Morris 1996).

#### ***Potential Impacts and Mitigation Measures***

The grades are suitable for the planned cultivation uses in the lower elevations and the pasture uses in the upper elevations of the site.

### **3.3 DRAINAGE & SURFACE WATER RESOURCES**

The Kapulena Lands are bound to the east by Honokaia Gulch. Proceeding west, the lands are traversed by Malanahae Gulch, Kawaikalia Gulch, Kapulena Gulch, Waikoloa Stream, Waialeale Gulch and Waipunahoe Gulch—all perennial streams (see Figure 6, Streams and Drainageways). All of these streams were assessed as having medium cultural values and unknown aquatic and riparian values according to the State’s stream assessment study. Of these streams, Waikoloa Stream was deemed the most significant. The National Wetlands Inventory identifies two areas of wetland associated with Malanahae Gulch. These wetlands may be remnant reservoirs, constructed for agricultural irrigation purposes.

The Kapulena Lands are designated Zone X by the Flood Insurance Rate Map, indicating that the lands lie outside the 500-year floodplain (see Figure 7, Flood Insurance Rate Map). Stream crossings by the existing cane roads are over culverts. These culverts are eroded in places and may require improvements.

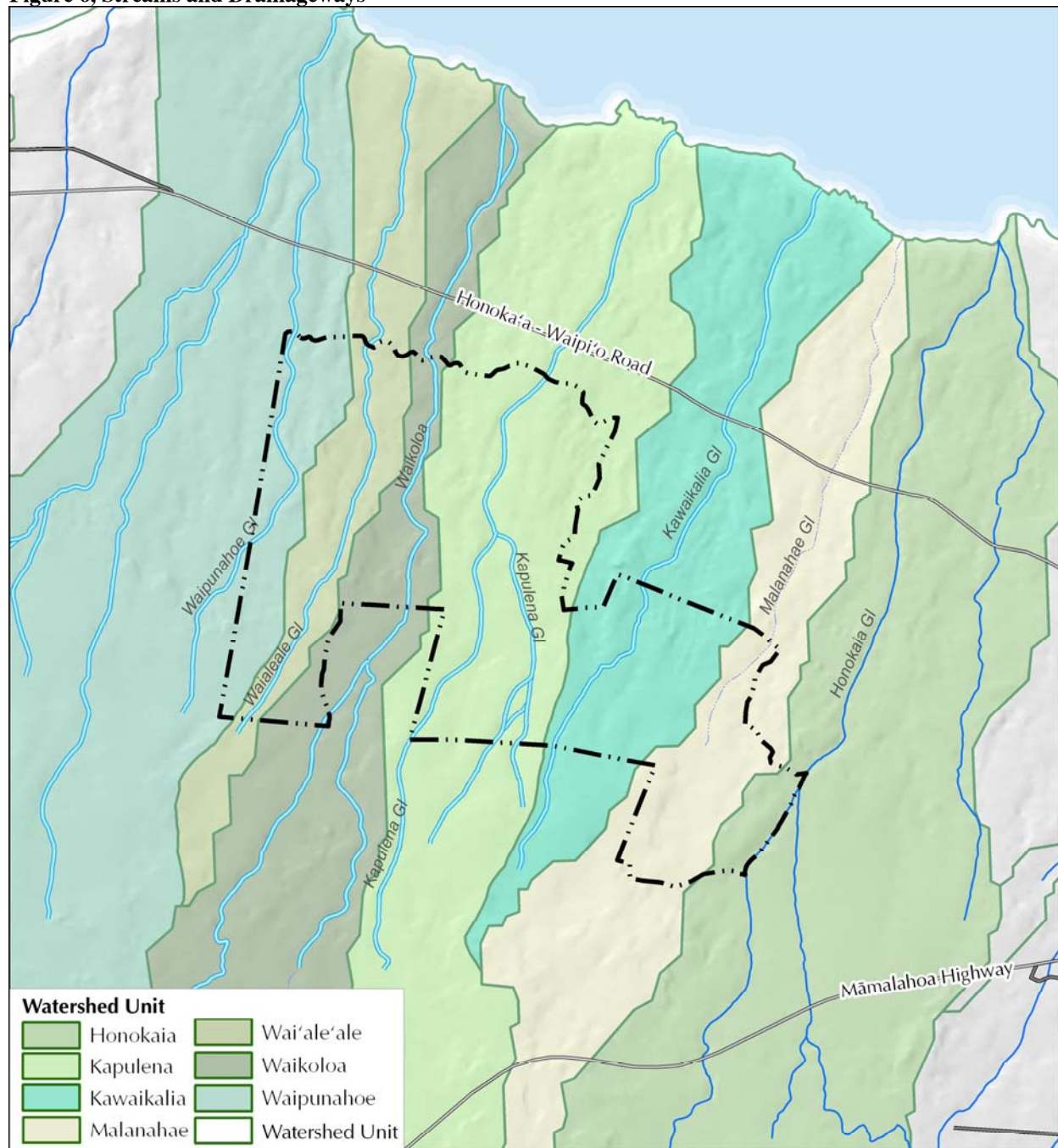
#### ***Potential Impacts and Mitigation Measures***

Although there are no plans to divert water from the streams for irrigation, any future diversion considerations should be required to have an aquatic survey to assess the habitat values and impacts.



# KAPULENA AGRICULTURAL PARK DRAFT ENVIRONMENTAL ASSESSMENT

**Figure 6, Streams and Drainageways**

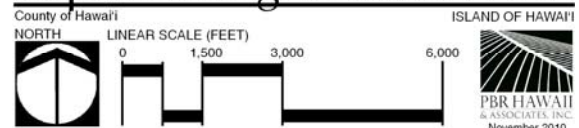


## LEGEND



## Watersheds & Streams

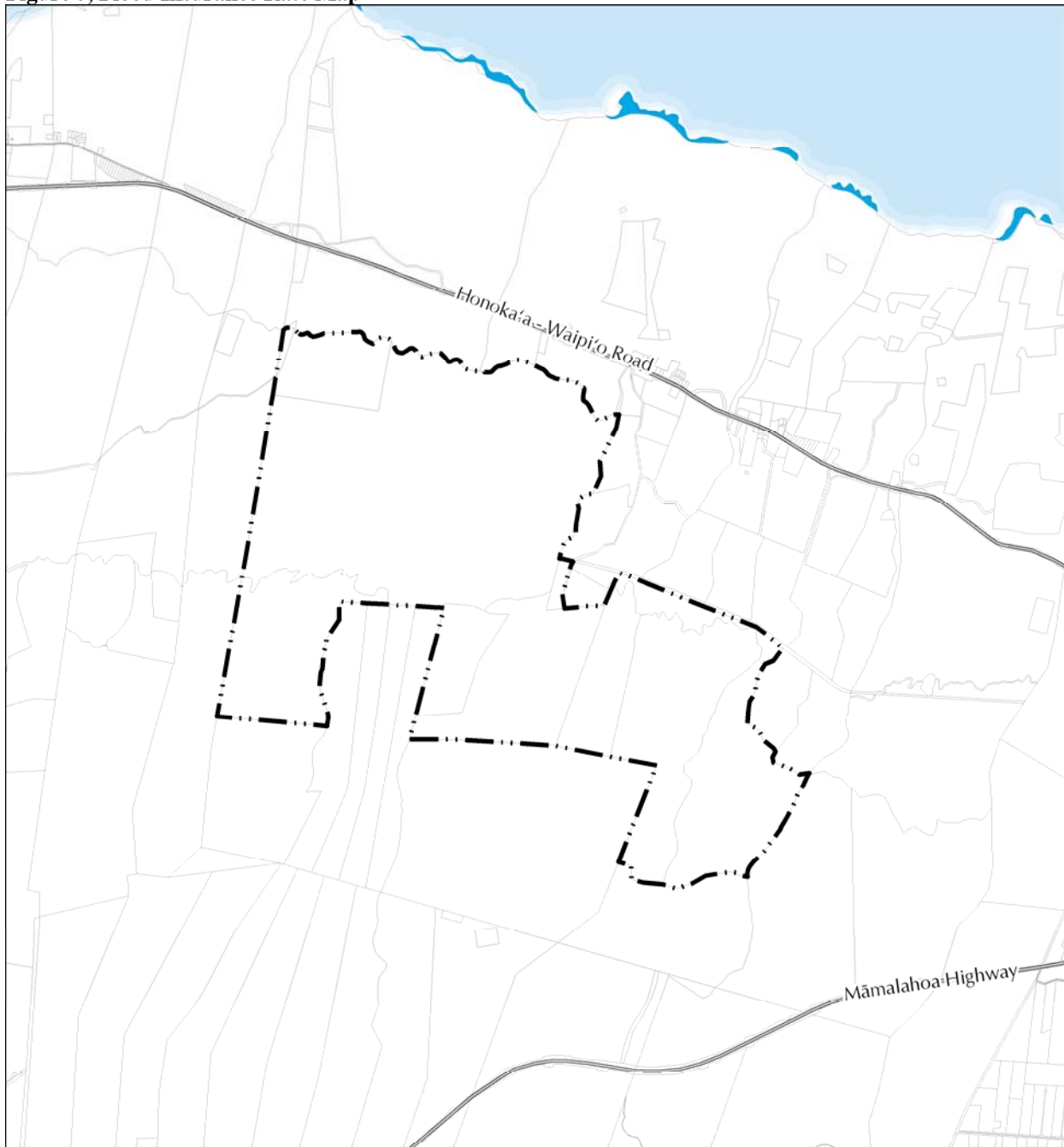
## Kapulena Agricultural Park



Source: CWRM Stream Assessment/DLNR Division of Aquatic Resources (2004); GDSI (1995)  
Disclaimer: This graphic has been prepared for general planning purposes only.

KAPULENA AGRICULTURAL PARK  
DRAFT ENVIRONMENTAL ASSESSMENT

Figure 7, Flood Insurance Rate Map



**LEGEND**

- Kapulena  
 Roads

**Flood Rating**

- Floodway  
 100-Year Floodplain  
 500-Year Floodplain  
 Outside Floodplain / Minimal Flooding

Source: Federal Emergency Management Agency (2007)  
Disclaimer: This graphic has been prepared for general planning purposes only.

Flood Insurance Rate Map

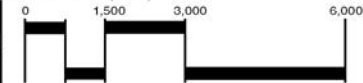
**Kapulena Agricultural Park**

County of Hawai'i

NORTH



LINEAR SCALE (FEET)



ISLAND OF HAWAII



### 3.4 SOILS

Three soil suitability studies have been prepared for lands in Hawai'i. These are the U.S. Department of Agriculture *Soil Conservation Service Soil Survey* (USDA 1972), the University of Hawai'i Land Study Bureau *Detailed Land Classification* (Baker 1965), and the State of Hawai'i Department of Agriculture's *Agricultural Lands of Importance to the State of Hawai'i* (ALISH) (State of Hawai'i 1977). The principal focus of these studies has been to describe the physical attributes of Hawai'i's lands and the relative productivity of different land types for agricultural production purposes.

#### 3.4.1 Soil Conservation Service Soil Survey

The *Soil Survey of the Island of Hawai'i, State of Hawai'i* (USDA 1972) identifies the following eight soil types at the Kapulena Lands (Figure 8, Soils).

- Honokaa Silty Clay Loam, Low Elevation, HsD (10–20% slopes)
- Honokaa Silty Clay Loam, Low Elevation, HsE (20–35% slopes)
- Honokaa Silty Clay Loam, HTD (10-20% slopes)
- Kukaiau Silty Clay Loam, KuD (12-20% slopes)
- Kukaiau Silty Clay Loam, KuE (20-35% slopes)
- Paauhau Silty Clay Loam, PaD (12-20% slopes)
- Paauhau Silty Clay Loam, PaE (20-35% slopes)
- Rough Broken Land, RB

**Honokaa Silty Clay Loam, 10–20% slopes (HTD)** constitutes approximately 345 acres, or roughly 20 percent of the Kapulena Lands, and is located at the site's highest elevations. In a representative profile, the surface layer is dark brown silty clay loam, approximately 6 inches thick. The subsoil is also silty clay loam. It is dark brown, very dark brown, and very dark grayish brown and is approximately 59 inches thick. This soil is medium acid to slightly acid throughout the profile. It dehydrates irreversibly into fine gravel-size aggregates. Permeability is rapid, runoff is slow, and the erosion hazard is slight. Roots can penetrate to a depth of 5 feet or more. This soil is used mostly for pasture and woodland. At the time of the survey (1972), a small acreage at the lowest elevation was used for sugarcane. These soils are in capability Class IV.

**Honokaa Silty Clay Loam, Low Elevation, 10–20% slopes (HsD)** constitutes approximately 28 acres or roughly 1.6 percent of the Kapulena Lands. This soil is similar to Honokaa silty clay loam 10 to 20 percent slopes, except that it occurs at a lower elevation where the soil temperature is warmer. This soil was historically used mainly for sugarcane. Small areas are used for pasture and macadamia nuts. These soils are in Capability Class IV.

**Honokaa Silty Clay Loam, slopes Low Elevation, 20–35% (HsE)** constitutes approximately 255 acres or roughly 15 percent of the Kapulena Lands. A band of this soil type runs the length of the site between the 1600 foot and 1700 ground elevation level. This soil is similar to Honokaa silty clay loam 10 to 20 percent slopes, except that it is steep and occurs at a lower



KAPULENA AGRICULTURAL PARK  
DRAFT ENVIRONMENTAL ASSESSMENT

elevation where the soil temperature is warmer. Runoff is medium, and the erosion hazard is moderate. This soil was used mostly for sugarcane. Small areas are used for pasture and macadamia nuts. These soils are in Capability Class VI.

**Kukaiau Silty Clay Loam, KuD (12-20% slopes)** constitutes approximately 752 acres, or roughly 43 percent of the Kapulena Lands. At the site, it is found between the 1000 foot and 1600 foot ground elevations.

The Kukaiau series consists of well-drained silty clay loams that formed in volcanic ash. These soils are gently sloping to steep. They are on uplands at an elevation ranging from 500 to 1,500 feet and receive from 70 to 100 inches of rainfall annually. Their mean annual soil temperature is between 67° and 69° F. The natural vegetation consists of hilograss, kaimi clover, guava, and 'ōhi'a. These soils and Honokaa, Ookala, and Paauhau soils are in the same general area.

Historically, Kukaiau soils were used mostly for sugarcane. Small areas are used for truck crops, macadamia nuts, and pasture.

This soil is low on the windward side of Mauna Kea. It is dissected by many, deep, narrow gulches. In a representative profile the surface layer is very dark grayish-brown silty clay loam about 10 inches thick. The subsoil is dark-brown silty clay loam about 40 inches thick. It is underlain by basalt. The surface layer is extremely acid, and the subsoil is medium to slightly acid. This soil dehydrates irreversibly into aggregates the size of fine sand. Runoff is medium and the erosion hazard is moderate.

This soil was used mainly for sugarcane. Small areas are used for macadamia nuts and pasture. (Capability subclass IVE, nonirrigated; sugarcane group 3; pasture group 7; woodland group 5)

**Kukaiau Silty Clay Loam, KuE (20-35% slopes)** constitutes approximately 127 or roughly 7 percent of the Kapulena Lands. This soil is similar to Kukaiau silty clay loam, 6 to 12 percent slopes, except for the steeper slopes. Runoff is rapid, and the erosion hazard is severe. Included in mapping are small areas in drainageways that have very steep slopes. This soil was historically used mostly for sugarcane. Small areas are used for pasture. (Capability subclass VIe, nonirrigated; sugarcane group 3; pasture group 7; woodland group 5)

**Paauhau Silty Clay Loam, PaD (12-20% slopes)** constitutes approximately 2 acres, less than one percent of the Kapulena Lands. The Paauhau series consists of well-drained silty clay loams that formed in volcanic ash. These soils are gently sloping to steep. They are in coastal areas on Mauna Kea at an elevation ranging from near sea level to 1,000 feet and receive from 60 to 80 inches of rainfall annually. Their mean annual soil temperature is between 72° and 74° F. The natural vegetation consists of bermudagrass, hilograss, kaimi clover, and carpetgrass. These soils and Kukaiau and Ookala soils are in the same general area. Paauhau soils are used mostly for sugarcane. Small acreages are used for truck crops and pasture. This soil is low on the windward side of Mauna Kea. The dominant slope is 15 percent. In a representative profile the surface layer is very dark grayish-brown silty clay loam about 10 inches thick. The subsoil is dark-brown silty clay loam about 34 inches thick. The substratum is weathering, basic igneous rock. This soil dehydrates irreversibly into fine sand-size aggregates. It is strongly acid in the surface layer and medium acid to slightly acid in the subsoil. Permeability is moderately rapid, runoff is medium, and the erosion hazard is moderate. Roots can penetrate to a depth of 3 feet or more. The available water capacity is 1.8 inches per foot of soil. This soil was historically used mostly for

KAPULENA AGRICULTURAL PARK  
DRAFT ENVIRONMENTAL ASSESSMENT

sugarcane. Small acreages are used for pasture and truck crops. (Capability subclass IVe, irrigated, and IVe, nonirrigated; sugarcane group 1; pasture group 7; woodland group 5)

**Paauhau Silty Clay Loam, PaE (20-35% slopes)** also constitutes approximately less than one percent of the Kapulena Lands, occupying approximately 10 acres at the site's lowest elevations. This soil is similar to Paauhau silty clay loam, 12 to 20 percent slopes, except that it is steeper. Runoff is rapid, and the erosion hazard is severe. Historically, this soil was used for sugarcane. Small acreages are used for pasture. (Capability subclass VIe, irrigated, and VIe, nonirrigated; sugarcane group 1; pasture group 7; woodland group 5)

**Rough broken land, (RB)** constitutes approximately 248 acres, or roughly 14 percent of the Kapulena Lands and is found along most of the site's gulches. Rough broken land is a miscellaneous land type that consists of very steep, precipitous land broken by many intermittent drainage channels. It occurs primarily in gulches, and the slope is dominantly 35 to 70 percent. The soil material ranges from very shallow to deep. Stones and rock outcrops are common in some areas. Elevation ranges from near sea level to 3,000 feet, and the annual rainfall ranges from 50 inches to more than 150 inches. Vegetation varies with rainfall. Kukui trees are common in the gulches. There are a few, scattered waterfalls. Rough broken land is used for pasture, woodland, wildlife habitat, and recreation areas. Adapted pasture plants and yields are similar to those for soils associated with this land type. These soils are in Capability Class VII.

Soil capability grouping shows, in a general way, the suitability of soils for most kinds of field crops. Soils are classed from I to VIII, with Capability Class I being the best suited for agriculture and Class VIII being the least suited. As described above the Kapulena site is comprised of soils in Classes IV, VI, and VII.

- Class IV soils have very severe limitations that reduce the choice of plants, require very careful management, or both.
- Class VI soils have severe limitations that make them generally unsuited to cultivation and limit their use largely to pasture or range, woodland, or wildlife.
- Class VII soils have very severe limitations that make them generally unsuited to cultivation and restrict their use largely to pasture or range, woodland, or wildlife.

Capability subclasses, which are designated by adding a letter after the roman numeral, indicate the main limitation risk. For example, Paauhau Silty Clay Loam and Kukaiau Silty Clay Loam are classed as IVe, VIe, indicating that the main limitation risk is from erosion, unless close growing vegetative cover is maintained.

### 3.4.2 Land Study Bureau Soil Rating

The *Detailed Land Classification, Island of Hawai'i* (Baker et al. 1965) classifies non-urban areas based on a five-class rating system for agricultural productivity using the letters A, B, C, D, and E. Under this system, A represents the highest class of productivity and E the lowest. The Pa'auilo Lands comprise lands rated B, C, D and E (Figure 9, Detailed Land Classification).

The site contains lands rated C, D and E. "C" or "fair" lands are associated with the lower elevation portions of the site which are primarily comprised of Kukaiau Silty Clay Loam, 12-20% slopes. "D" or poor lands roughly correspond with areas of Honokaa Silty Clay Loam 20-

35% slopes and Honokaa Silty Clay Loam 10-20% slopes soils located at the site's higher elevations. The land rated E, or of the very lowest productivity are associated with the gulches that cross the site.

### **3.4.3 Agricultural Lands of Importance**

The ALISH system classifies four types of land: Prime Lands, Unique Lands, Unclassified, and Other Lands (State of Hawai'i 1977). See Figure 10, Agricultural Lands of Importance.

Prime Agricultural Land is land best suited for the production of food, feed, forage, and fiber crops. When treated and managed, including water management, and according to modern farming methods, the land has the soil quality, growing season, and moisture supply needed to economically produce sustained high yields of crops (State of Hawai'i 1977).

Other Agriculture Land is land other than Prime or Unique Agricultural Land that is also of statewide or local importance for the production of food, feed, fiber, and forage crops. The lands in this classification are important to agriculture in Hawai'i yet exhibit properties, such as seasonal wetness, erosion, limited rooting zone, slope, flooding, or drought, which exclude the lands from the Prime or Unique Agricultural Land classifications. By applying greater inputs of fertilizer and other soil amendments, providing drainage improvements, implementing erosion control practices, and providing flood protection, these lands can be farmed satisfactorily and produce fair to good crop yields (State of Hawai'i 1977).

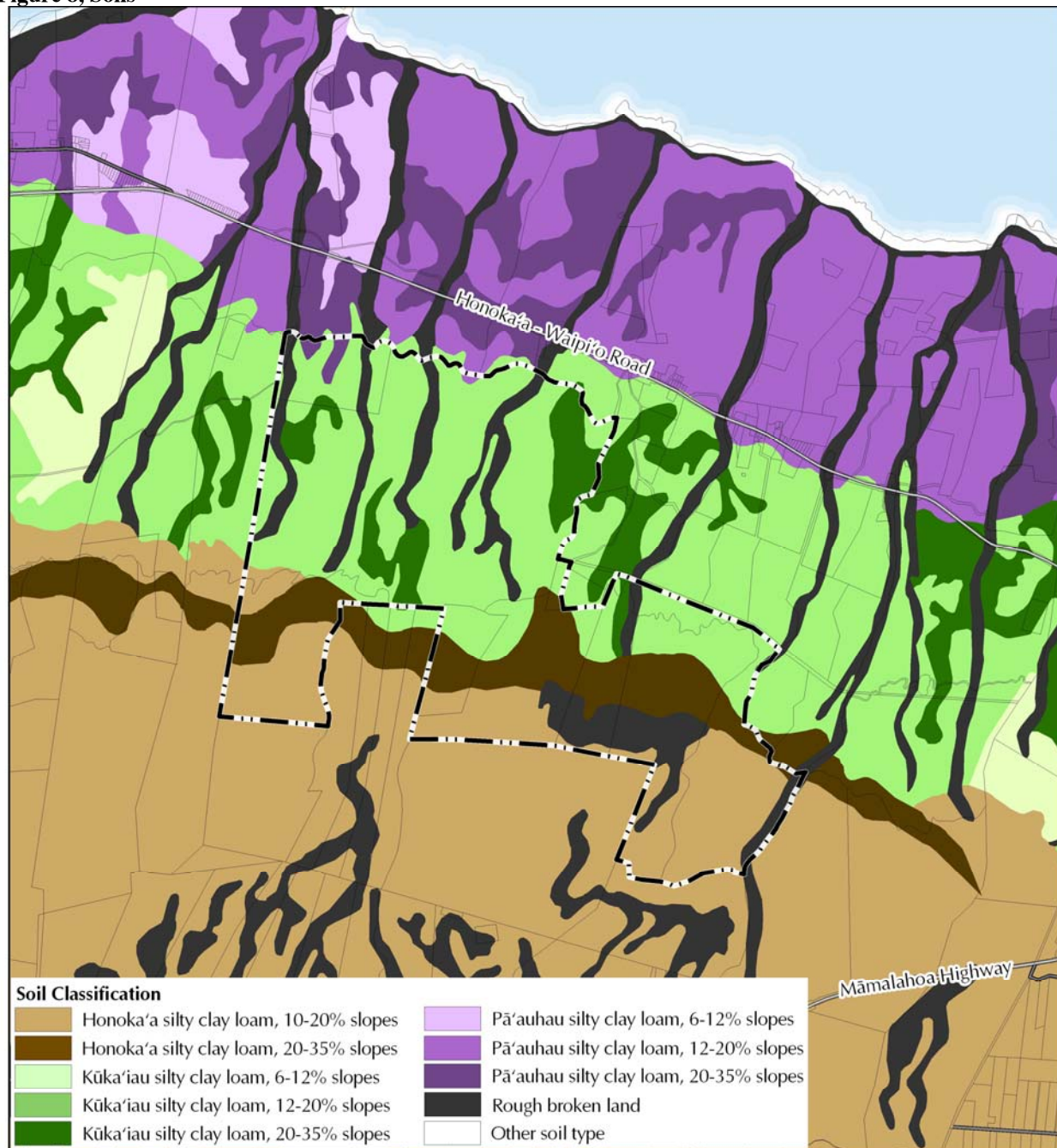
The Kapulena Lands includes areas of Prime Lands. These lands are associated with the lower elevations of the site that are comprised of Kukaiau Silty Clay Loam, 12-20% slopes and are rated "C" by the Detailed Land Classification (both previously discussed). The higher elevation lands on the site are unclassified by the ALISH system. These unclassified areas roughly correspond with the soil types Honokaa Silty Clay Loam 20-35% slopes and Honokaa Silty Clay Loam 10-20% slopes and are rated E by the Detailed Land Classification. Land within the gulches are also unclassified by the ALISH system. Areas of the site classified as "Other" by the ALISH system roughly correspond with the Kukaiau Silty Clay Loam 20-35% slopes soil type which are scattered throughout the site.

### ***Potential Impacts and Mitigation Measures***

To mitigate soil erosion from agricultural practices, the County is developing a conservation plan for review and approval by the Natural Resource Conservation Service (NRCS). All agricultural lessees or permittees using the site will be subject to this plan.

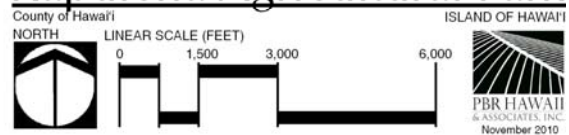
# KAPULENA AGRICULTURAL PARK DRAFT ENVIRONMENTAL ASSESSMENT

**Figure 8, Soils**



Natural Resources Conservation Service  
Soil Classification

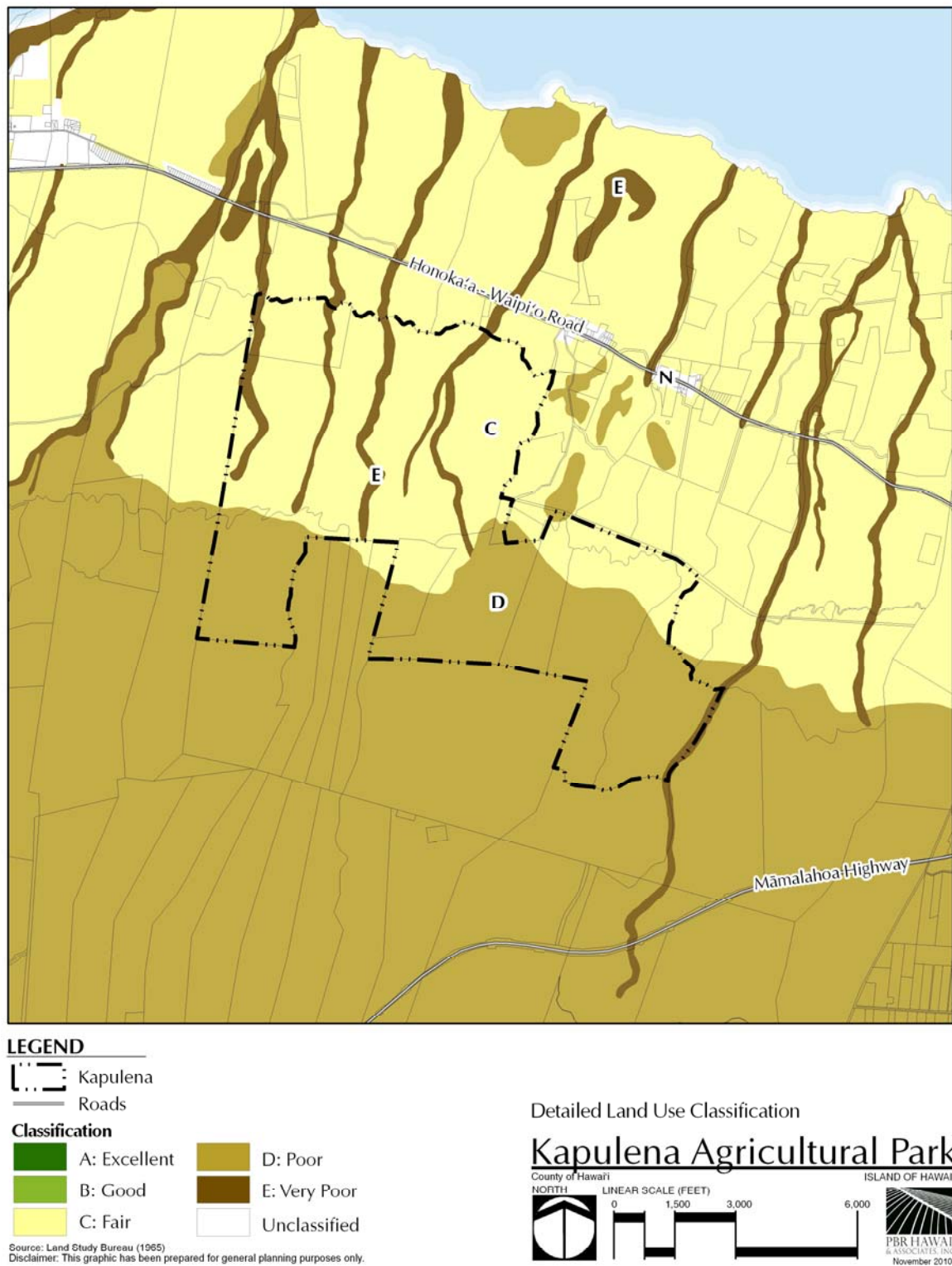
## Kapulena Agricultural Park



Source: Natural Resources Conservation Service  
Disclaimer: This graphic has been prepared for general planning purposes only.

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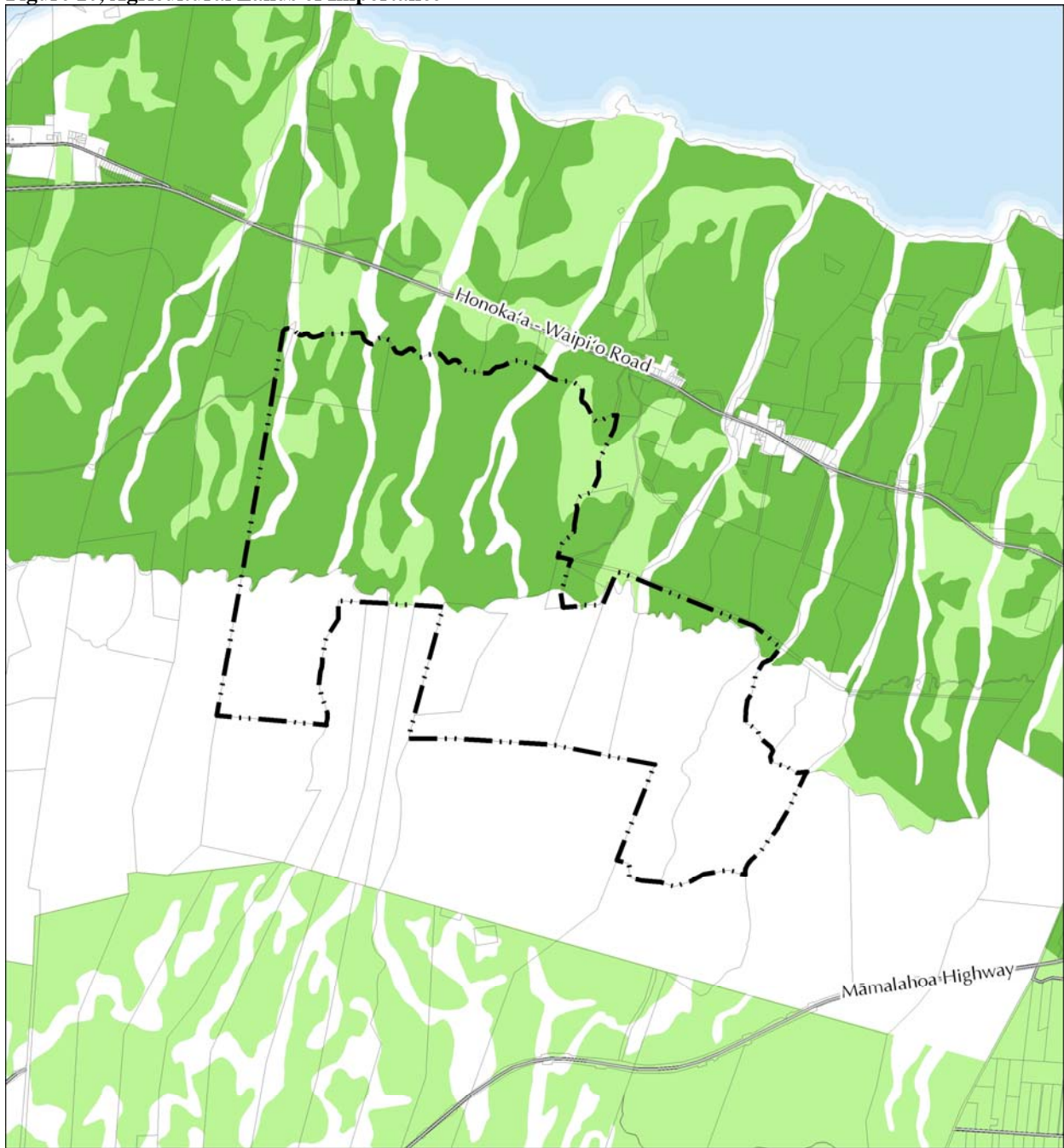
Figure 9, Detailed Land Classification





# KAPULENA AGRICULTURAL PARK DRAFT ENVIRONMENTAL ASSESSMENT




**Figure 10, Agricultural Lands of Importance**



## LEGEND

 Kapulena  
 Roads

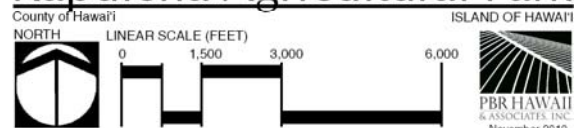
### Definition

 Prime ALISH  
 Other ALISH  
 Unclassified

Source: State of Hawai'i Dept of Agriculture (1977)  
Disclaimer: This graphic has been prepared for general planning purposes only.

Agricultural Lands of Importance  
to the State of Hawai'i

## Kapulena Agricultural Park



### **3.5 GROUNDWATER RESOURCES AND HYDROLOGY**

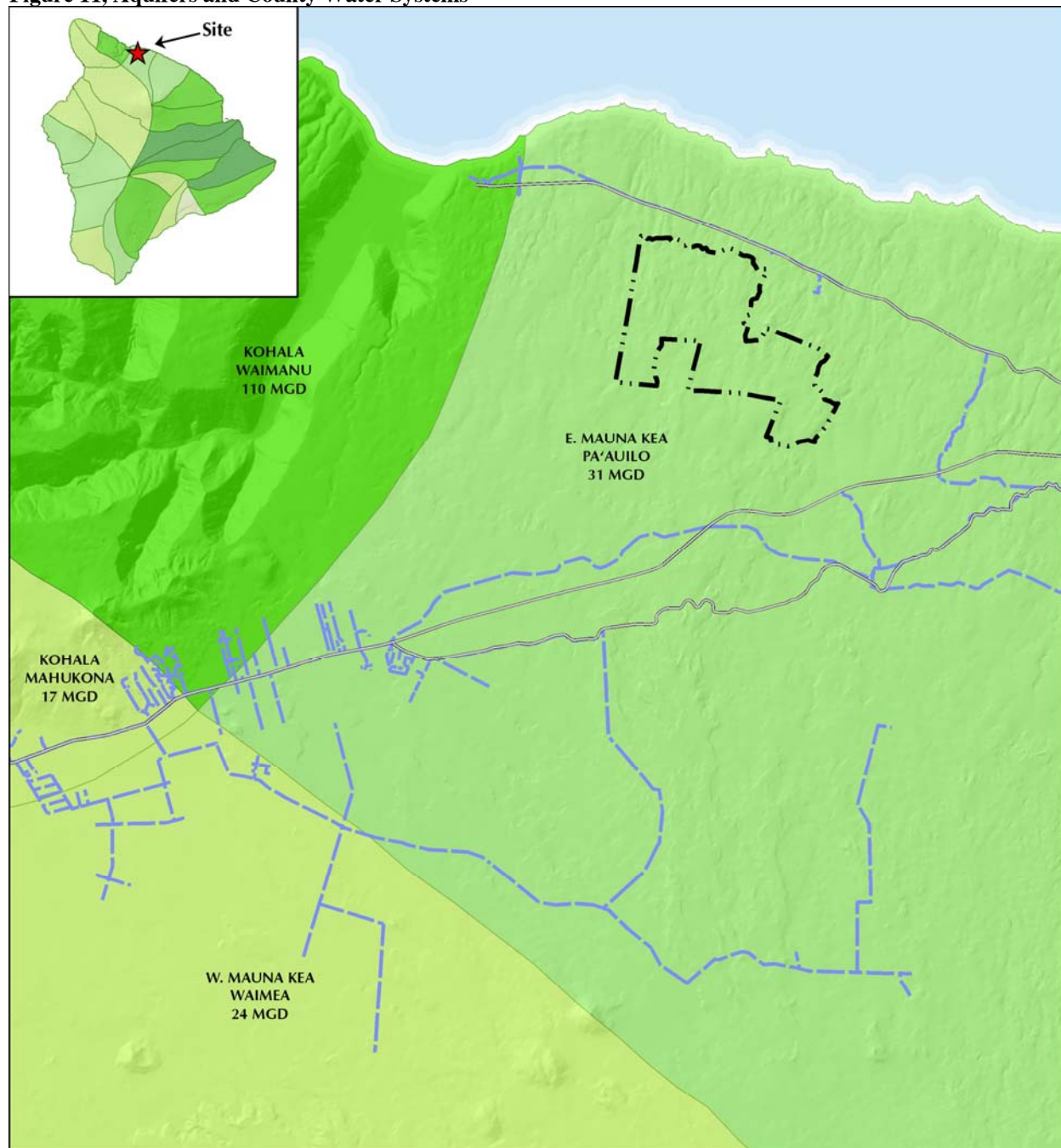
Kapulena sits atop the Honoka‘a system, which is a component of the East Mauna Kea Aquifer. The Honoka‘a system has a sustainable yield of approximately 31 million gallons per day (Hawai‘i DLNR). The Kukuiahaele County water system main is located makai of the site along Highway 240 but would require a connecting line over private property and pumping up to the site. There is a line from the Waimea Water system serving the Boy Scout Camp mauka of the site that could serve the site by gravity flow, but would require crossing over private property (see Figure 11, Aquifers and County Water Systems).

#### ***Potential Impacts and Mitigation Measures***

No farm dwellings are contemplated or will be permitted. The likely irrigation sources include pumping from the Lower Hāmākua Ditch or water catchments. Deepwell drilling to tap groundwater may not be cost-effective, and would be subject to Water Commission well permits when proposed. The proposed educational facilities will likely rely on water catchments. Any proposals requiring offsite improvements for the Lower Hāmākua Ditch or connection to the County water system would be assessed separately from this EA. If subdivision is required for leasing or other purposes, the pre-existing lots described in section 1.3 enable a consolidation and resubdivision into 32 lots without having to meet County road and water standards.

# KAPULENA AGRICULTURAL PARK DRAFT ENVIRONMENTAL ASSESSMENT

**Figure 11, Aquifers and County Water Systems**



## LEGEND

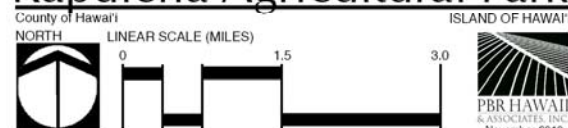
- Kapulena
- Roads
- Water Pipeline

## Sustainable Yield

- 1 MGD - 10 MGD
- 10 MGD - 30 MGD
- 31 MGD - 100 MGD
- 101 MGD - 200 MGD
- 201 MGD - 450 MGD

## Aquifers & Pipelines

## Kapulena Agricultural Park



Source: County of Hawaii Department of Water Supply; Department of Land & Natural Resource (2008)  
Disclaimer: This graphic has been prepared for general planning purposes only.



### 3.6 NATURAL HAZARDS

Natural hazards that could impact the property include earthquakes, volcanic eruptions, hurricanes, and flooding. The island of Hawai‘i is associated with volcanic eruption and earthquakes. The U.S. Geological Survey (USGS) has developed lava-flow hazard zones with a numerical rating of 1 to 9, with 1 having the greatest risk. The site is within Lava-Flow Hazard Zone 8, which indicates that only a few percent of this area has been covered by lava in the past 10,000 years (USGS, 1992).

The State of Hawai‘i has been affected twice in the past two decades by devastating hurricanes – Hurricane ‘Iwa, in 1982, and Hurricane ‘Iniki in 1992. The most recent series of earthquakes, with magnitudes of 6.7 and 6.0, occurred at Kīholo Bay on October 15, 2006. While it is difficult to predict these natural occurrences, it is reasonable to assume that future events could occur.

The project area, as the rest of the island and state, is vulnerable to the destructive winds and torrential rains associated with hurricanes. Honoka‘a High School, located approximately 5 miles east of the project site, is a designated Emergency Evacuation Center for the area (State Civil Defense, 2007).

According to the Flood Insurance Rate Map (FIRM), the project site is designated as Zone X, outside of the 500-year floodplain (see Figure 7). The site is located approximately a mile from the shoreline and is outside of the tsunami evacuation area.

#### *Potential Impacts and Mitigation Measures*

The proposed agricultural park is not expected to exacerbate any risks or exposure to hazardous conditions.

### 3.7 FLORA

A botanical survey of the site was conducted between September 28 and October 1, 2009 with the objectives to document plant species on the property; document the status and abundance of each species; determine the presence or likely occurrence of any native flora, particularly any that are Federally listed as Threatened or Endangered; and, determine if the project area contains any special habitats which if lost or altered might result in a significant negative impact on the flora in this part of the island. The Botanical Survey Report was incorporated into a Flora and Fauna Study Assessment and is attached as Appendix B.

Most of the site (approximately 90% of the land area) is dominated by two plant species, Guinea grass and common ironwood. These plants have rapidly colonized the former cane fields since they went out of agricultural production 15 years ago. The report describes the Guinea grass as “nearly impenetrable” and the ironwood trees as, “dense, 30 – 50 foot tall stands”. However, other plant species were identified on the site, primarily surviving in the many gulches which dissect the property. During the survey, 21 native species were identified, including nine species that are endemic to Hawai‘i. Those native and endemic plants that were identified are relatively common and none are listed as rare. Other non-native plant species found on site are of no

KAPULENA AGRICULTURAL PARK  
DRAFT ENVIRONMENTAL ASSESSMENT

special conservation interest or concern. A complete list of recorded plants is included with the Flora and Fauna Assessment (Appendix B).

The Botanical Survey Report findings indicated that the entire site showed signs of pig rooting. The Report found that, “*this was especially true in the gulches where every square foot appeared to be heavily rooted. This rooting had the twin effects of severely limiting the diversity of the more delicate native understory species, while at the same time aiding the spread of aggressive, shade-tolerant weeds such as the strawberry guava.*”

### ***Potential Impacts and Mitigation Measures***

No plant species listed or proposed as Threatened or Endangered by the U.S. Fish and Wildlife Service or the Hawai‘i State Department of Land and Natural Resources were found. The property has been heavily altered by sugar cane cultivation, and in the last 15 years has been degraded by invasive plant species and feral pigs. The Botanical Survey Report recommends that any future uses in the area consider the protection and enhancement of the best examples of remnant strips of native forest in the property’s gulches.

## **3.8 FAUNA**

A Fauna Survey was conducted in conjunction with the Botanical Survey. The Fauna Survey is found in Appendix B, Flora and Fauna Survey and Assessment. Nine site visits were conducted, including four during the evening to detect occurrence of the Hawaiian hoary bat (‘ōpe‘ape‘a, *Lasiurus cinereus semotus*).

A single ‘ōpe‘ape‘a was sighted near the site’s rock quarry (approximately 1,600 foot ground elevation). The report indicates that the ‘ōpe‘ape‘a is a common and highly mobile species and that it is likely that more of this species would be detected at a different time on the property. Feral pig (*Sus Scrofa*) was found to be abundant and a few mongoose were sighted. The report indicates that while not sighted, feral cats (*felis catus*), rats (*Rattus spp.*) and mice (*Mus domesticus*), are also likely present on site.

In general, the report finds that due to the overwhelming colonization of Guinea grass and ironwood trees, bird life was relatively sparse in both diversity and number. Although native and endemic birds such as the Hawaiian Hawk (‘io, *Buteo solitarius*) and Hawaiian owl (pueo, *Asio flammeus sandwichensis*) were specifically looked for, none were sighted. While not sighted, the ‘io and pueo are known to be found in the Hāmākua district and could be expected to occasionally use this site. Additionally, no native seabirds such as the threatened Newell’s shearwater (*Puffinus auricularis newellii*) or the Endangered petrel (*Pterodroma sandwichensis*) were found, nor were any shearwater burrows found. A complete list of the ten, non-native bird species that were sighted is included with the Flora and Fauna Survey (Appendix B).

The Fauna Survey also looked for insects which have been listed as Federally Endangered such as Blackburn’s sphinx moth (*Manduca blackburni*) and three endemic picture-wing flies (*Drosophila heteroneura*), (*D. mulli*) and *D. ochrobasis*). None of these insects or their larvae were observed, nor were any of the host plant species normally associated with these insects found on site.

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The Fauna Survey concludes that due to the low quality of habitat characterized by the dominance of Guinea grass and common ironwood, there is little to attract a diversity of mammal and bird species. The only species that is common throughout the property is the feral pig and the site's dense vegetation makes it difficult for hunters to be effective at controlling the population.

***Potential Impacts and Mitigation Measures***

Due to the degraded habitat, the Fauna Survey Report does not recommend any special measures be taken.

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## **4.0 ASSESSMENT OF THE HUMAN ENVIRONMENT, POTENTIAL IMPACTS AND MITIGATION MEASURES**

This chapter provides background information on the existing human environment of the proposed project area. Subject areas addressed include archaeology, historic resources, culture, noise, air quality, visual environment, population and housing, community character, and economic environment. This chapter also addresses the potential impacts of the proposed agricultural park and identifies appropriate mitigation measures to minimize the identified short-term and long-term impacts.

### **4.1 ARCHAEOLOGICAL AND HISTORIC RESOURCES**

An Archaeological Inventory Survey (AIS) of the site was conducted in 2009, to “identify and evaluate historical properties pursuant to state cultural resources management regulations” (SCS 2010). Seventeen sites comprised of 28 features were recorded during the AIS (Appendix C). Four of the sites were rock shelters used intermittently for temporary habitation during the pre-Contact Era. One site was a disturbed multi-tier platform that might be the remains of a heiau known to have existed in Kapulena Ahupua‘a. The majority of features were rock mounds, terraces, rock walls and drainage ditches associated with Historic Era sugarcane cultivation.

Inventory field work included: a pedestrian survey of the entire site; plotting located sites on a project area map with Global Positioning System (GPS); individual site mapping and recording; and hand excavations. Some sites were selected for test excavation to determine site characteristics including site function, construction method, and temporal placement. Two types of hand excavation, Test Units (TU) and Stratigraphic Trenches (ST) were utilized depending on the size of features and desired percentage to be excavated, desired percentage of screening and overall goals of excavation. The archival component of the survey included database, library and report research into the history of the area as well as searches for archaeological studies of the site and immediately surrounding area.

There is limited prehistoric information pertaining to the area as the site is located in what was traditionally a sparsely populated area with poor access to marine resources and population centers of Waipi‘o Valley, Hilo and Waimea. The project area is not at the nexus of a trail system, as much of the cross-inland travel was conducted on trails that crossed the saddle between Mauna Kea, Mauna Loa and Huālalai.

In published mo‘olelo, Kapulena is named for the king shark of Hāmākua. Waikoloa, a gulch that runs through the ahupua‘a is named for a wind and is literally translated as, “water pulling far”. Another stream in the ahupua‘a, Wai‘ale‘ale is literally translated as, “rippling or overflowing water”.

Early historic accounts of the area include the travels of Reverends William Ellis and Asa Thurston on their way to Waipi‘o in 1823. They met a small group of people at Malanahae and continued on to Kapulena where they preached to an assembly of about one hundred people. They observed that the path from Kapulena to Waipi‘o was crooked and bordered on both sides by tall grass and well-cultivated “plantations”.

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Isabella Bird also traveled through the area in 1872. She noted the rough and steep trails on her journey from Hilo to Waipi'o. Bird also describes the sugar plantation at Kaiwiaki (Onomea Plantation). At the time of her journey, the Hamakua Mill Company and Pacific Sugar Mill Company had not yet been established.

Between 1869 and 1880, seven sugar companies were established along the Hāmākua coast. The Pacific Sugar Mill Company, established in 1878 in Kukuihaele maintained cultivated sugar cane fields in the project area. The AIS includes information from the University of Hawai'i's Hawaiian Sugar Planters' Association Plantation Archives about the Pacific Sugar Mill Company, documenting that the plantation extended along the coast for four miles and up the mountains from two to nine miles. The elevation ranged from 300 to 1,900 feet giving a variety of growing conditions. Pacific Sugar Mill has the distinction of introducing the mongoose into Hawai'i. The plantation had cattle and was unique for its many head of sheep. Free mutton was given to employees along with housing and healthcare. The plantation did not prosper due to mis-management and in 1913 it was decided to close the mill and merge with Honokaa Sugar Mill Company. In 1916 the mill equipment was sold. The Honokaa sugar mill grew to encompass more than 9,000 acres. It had an extensive flume system to carry the cane to railroad cars and eventually to the mill. Bagged sugar was transported by a tramway from the mill to a warehouse at the boat landing. Wire cable conveyed the bagged sugar from the warehouse to steamships. By this method Honokaa Sugar Company was able to ship raw sugar directly to the US mainland, bypassing Honolulu. The Honokaa Sugar Company eventually operated as the Hamakua Sugar Company which was in operation until October, 1994.

The AIS also documents previous archaeological investigations in the area, indicating that most studies focused on sites in Waipi'o Valley and that no studies have been conducted at the project site.

The Archaeological Inventory Survey Results recorded 17 sites comprised of 28 features (see Appendix C). Information recorded during the current study has adequately ascertained the timing and function of all features at all 16 sites. The majority of the sites are associated with Historic-era sugarcane field clearing. Four of the sites are associated with pre-Contact temporary habitation. Artifact recovered from the rock shelters were traditional basalt and volcanic-glass tool debitage and marine shell.

One site (SITE 28385 TS-5, Appendix C) is a possible heiau remnant from the pre-Contact era. The multi-tiered platform is located at the top of a mauka/makai oriented ridgeline at an elevation of 1,440 feet in Kapulena ahupua'a. The area surrounding the site is old sugarcane fields dominated by ironwood trees. There are several Christmas berry and guava trees growing on top of the platform. There is a sugarcane dirt road and ditch just west and north of the platform. The entire east and south sides of the platform have been truncated by bulldozer. The AIS speculates that it is possible that the remaining platform is only the west end or the northwest corner of a much larger structure. The northeast and southwest tiers have been altered by bulldozers pushing portions of the feature and loose rock from the surrounding fields into them. There is a length of one inch thick wire cable embedded in the soil and rock on the east side of the feature. The AIS speculates that the cable might have been attached to a bulldozer during field clearing. The AIS concludes that the feature has been altered by sugarcane clearing activities and is in poor condition. However, based on the amount of labor that went into the multi-tier platform at this site and based on the construction style and are of the feature, it is possible that this is the remains of Pukioi'aka heiau. Evidence to support this hypothesis is the

lack of midden and habitation remains commonly recovered at habitation sites. The radiocarbon date recovered from test units (where burnt wood matter and charred materials were found) suggest a pre-Contact date for use of the platform.

### ***Potential Impacts and Mitigation Measures***

No further archaeology work is recommended for 16 of the 17 sites. Information recorded during the current study has adequately ascertained the timing and function of all features at all 16 sites. The sites are associated with Historic-era sugarcane field clearing and pre-Contact temporary habitation. Data recovery is recommended at the multi-tier platform at SITE 28385 to further refine the temporal association of the feature and to determine the platform's function. The platform has been badly impacted by sugarcane field clearing, only partially remains and is in poor condition. Only a small amount of charcoal was recovered from one test unit during subsurface testing. While a single radiocarbon sample returned a possible late pre-Contact Era to early post-Contact Era data range, additional radiocarbon samples are recommended to be obtained. It is possible based on a small amount of surface artifacts that the platform is a historic sugarcane structure built for loading or processing cane. However, the amount of labor expended to build the structure is uncommonly great compared to sugarcane features documented at other sugar plantation sites. Data recovery is recommended to answer these remaining research questions.

The agricultural park involves returning land to agricultural production. It is expected agricultural activities will resume on lands that were previously cleared and used for cultivation of sugar cane. However, care should be taken to avoid impacts to pre-Contact era temporary habitation sites (which are all located in close proximity to stream gulches, and unlikely to be cultivated). Additionally, special care should be taken to avoid any impacts to the pre-Contact era site that is possible remnants of a heiau. The site should not be cleared for land cultivation until additional archaeological testing is accomplished. Similarly, until additional archaeological testing is accomplished, if grazing is proposed for this area, the archaeological site should be protected by fencing. Proposed mitigation is avoidance of pre-Contact era temporary habitation sites and avoidance of the possible heiau site.

## **4.2 CULTURAL RESOURCES**

A Cultural Impact Assessment (CIA) in conformance with Act 50 of the State of Hawai'i (2000) was conducted in order to identify and address effects of the proposed action on Hawai'i's culture as well as traditional and customary rights and is included as Appendix D to this report. Preparation of the CIA followed the guidelines provided by the Office of Environmental Quality in 1997. This included documenting methods for selection of informants and agencies interviewed: following ethnographic interview procedures; reviewing historical materials; and, an analysis of the potential effects of the proposal on cultural resources.

The CIA found that two Land Commission Awards were made within the project area. One half of Malanahae Ahupua'a was awarded to Simeona Luluhiwalani (LCA 4: B, R.P. 7825). Two 'apana (LCA 9971: A and B) in Waikoloa ahupua'a were awarded to William Pitt Leleihoku. There is no descriptive information given for Leleihoku's two 'apana in Waikoloa ahupua'a. Luluhiwalani states in his claim in Malanahae that his right to the land was acquired when:

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*Kamehameha II sailed to Kawaihae - this was Kaneuwaine [1819] - the land of the Ali'i was cut up there. Then the Ali'i gave Malanahae to Hikiau. Kaleimoku said "This land is for my kaikaina." Then the chiefs asked, "To whom?" To Keoua, he is a kaikaina of us all. Kaleimoku approved /saying/ "This is my very own kaikaina." Then the Ali'i gave this land to him absolutely. Keoua was with Keeumoku at this time. /The land was held/ from this time. At the time in which Kamehameha II sailed for England, in the night Keoua died, and the next day the Ali'i sailed for England. When he was alive, Keoua directly bequeathed all his lands to me. I am above, my makuahine is below /one the lands held/ from Hawaii to Oahu. These are the land which I hereby present /as claims/ at this time (Waihona 'Aina 2000).*

The Pacific Sugar Mill Company was established in 1878 at Kukuihaele and cultivated sugar cane in fields within the current project area. The CIA includes information from the University of Hawai'i's Hawaiian Sugar Planters' Association Plantation Archives about the Pacific Sugar Mill Company, documenting that the plantation extended along the coast for four miles and up the mountains from two to nine miles. The elevation ranged from 300 to 1,900 feet giving a variety of growing conditions. Pacific Sugar Mill has the distinction of introducing the mongoose into Hawai'i. The plantation had cattle and was unique for the number of sheep. Free mutton was given to employees along with housing and healthcare. The plantation did not prosper due to mis-management and in 1913 it was decided to close the mill and merge with Honokaa Sugar Mill Company. In 1916 the mill equipment was sold. The Honokaa sugar mill grew to encompass more than 9,000 acres. It had an extensive flume system to care the cane to railroad cars and eventually to the mill. Bagged sugar was transported by a tramway from the mill to a warehouse at the boat landing. Wire cable conveyed the bagged sugar from the warehouse to steamships. By this method Honokaa Sugar Company was able to ship raw sugar directly to the US mainland, bypassing Honolulu. The Honokaa Sugar Company eventually operated as the Hamakua Sugar Company which was in operation until October, 1994.

Seven individuals who either worked for the Hamakua Sugar Company or live in the Hāmākua District and have knowledge of the lands of Kapulena were contacted for information for this report. Of the seven, six were reached by phone. Of the six, one person, Jim Thropp had knowledge the project site. None had knowledge of past or ongoing cultural practices on the project area. The CIA summarized the Jim Thropp interview:

*Jim was born in Honolulu and grew up in Kāne'ohe. He was 75 years old at the time of this interview. He studied general agriculture at California Polytechnic State University where he was awarded a degree in general crops production. He worked at a sugar plantation on Kaua'i before being hired by the Hamakua Sugar Company. Jim was in charge of crop logging, tissue testing, and fertilizer application. He remembers that the soil on the study parcel are weak in calcium, nitrogen, and phosphorus. He also stated that the earthen ditches on the project area are contour ditches created to draw water off of the fields and into the gulches. These are part of a man-made drainage system to prevent sheet wash and flooding down-slope. Jim did not remember any traditional Hawaiian features on either of the parcels. He said that by the time he was there, the company was using machinery to work the fields and harvest the crops. That meant that all rock was removed from the fields and pushed into the gulches to prevent the rock from fouling or damaging the machinery. He remembers that there were some large ulu trees in some of the gulches. Jim did not know of any*



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*cultural practices that might have been conducted during his time working for the plantation company.*

As suggested in the “Guidelines for Assessing Cultural Impacts” (OEQC 1997), CIAs incorporating personal interviews should include ethnographic and oral history interview procedures, circumstances attending the interviews, as well as the results of this consultation. It is also permissible to include organizations with individuals familiar with cultural practices and features associated with the project area.

Consultation was sought from the Director of Native Rights, Land and Culture, Office of Hawaiian Affairs on O‘ahu; the Hawai‘i branch of the Office of Hawaiian Affairs; the Kuakini Civic Club; and the Kona Hawaiian Civic Club. Except for OHA acknowledging the receipt of our letter, none of the organizations responded with information concerning the potential for cultural resources to occur in the project area, or with additional suggestions for further contacts.

Based on organizational response as well as archival research, it is reasonable to conclude that, pursuant to Act 50, the exercise of native Hawaiian rights, or any ethnic group, related to gathering, access or other customary activities will not be affected by development activities on this parcel.

***Potential Impacts and Mitigation Measures***

Because there were no cultural activities identified within the project area, there are no adverse effects anticipated by the CIA. Further, the former mauka-makai cane haul roads have been heavily overgrown with Guinea grass indicating that the roads have been unused or infrequently used for any activity. However, subsistence hunting is known to be practiced throughout mauka areas of Hāmākua. The agricultural park plan includes fencing of the paved, former cane haul road to protect the public’s safety from entering active cattle paddocks. In order to minimize access impacts, two former cane haul roads connecting the Waipi‘o-Honoka‘a Road and the quarry access road have been cleared of Guinea grass. It is expected that at least one of these roads will remain open, providing access for project use and cultural practitioners alike.

### **4.3 NOISE**

Currently, the project site is vacant, wooded land. No significant noise is generated on site, and ambient noise in the area emanates from wind, wildlife, and the infrequent traffic along the various access roads in the project vicinity. There are no existing dwellings near the site.

***Potential Impacts and Mitigation Measures***

Since no farm dwellings will be permitted on the site, there will be no noise concerns onsite. Noise from agricultural activities on the site should not impact any offsite dwellings due to the distance between residents in this sparsely populated area.

### **4.4 AIR QUALITY**

Air quality in Hawai‘i is among the best in the nation, and criteria pollutant levels remain well below state and federal ambient air quality standards. The State Department of Health, Clean Air Branch monitors the ambient air in Hawai‘i and has established a statewide system of monitoring stations whose primary purpose is ensuring that air quality standards are met. Hawai‘i Island is

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regularly affected by emissions from Mount Kilauea, or VOG. Due to the prevailing northeast winds, the site is less likely to be affected by VOG than sites on the south or Kona coasts. However, Kona winds can circulate VOG up the Hāmākua Coast in the site's vicinity.

Generally, air quality is affected by regional and local climate together with the amount and type of human activity in any given location. Federal and state ambient air quality standards have been established to regulate six parameters: particulate matter, sulfur dioxide, nitrogen dioxide, carbon monoxide, ozone, and lead. No state or county air-quality monitoring stations exist in the vicinity of the site.

Air quality in the vicinity of the site may be affected by pollutants from widely dispersed agricultural sources, such as concentrations of cattle and fugitive mists from infrequent spraying for agricultural pests. Other sources are emissions from occasional vehicular traffic on area roads and from farm machinery.

***Potential Impacts and Mitigation Measures***

There are no large, stationary sources of air pollutants and no major industries that would contribute to air pollution within, or in the vicinity of, the project area. The proposed agricultural activities will generate dust that is expected and acceptable for such activities.

## **4.5 VISUAL RESOURCES AND OPEN SPACE**

The natural beauty of Hawai'i is universally recognized and considered to be a significant and valuable asset. Various portions of the site offer spectacular views of the ocean, the upper slopes and summit of Mauna Kea, and the richly vegetated, broad lower slopes descending to the coast. In some *mauka* areas, near boundaries with private land and the Hāmākua Forest Reserve, there are views of native forest containing koa and 'ōhi'a trees.

The Kapulena Lands themselves are not listed in the *General Plan* as examples of natural beauty. Current agricultural zoning would preserve the current open space character of the lands.

***Potential Impacts and Mitigation Measures***

Should agricultural structures be constructed, the heights are limited to 45-feet. The height limit ensures that visual resources will not be greatly affected should structures be constructed. Additionally, a return to agricultural use could mean removal of ironwood trees which have come to dominate the site's vegetation. Tree removal could serve to provide greater visual access to the coastline or mauka to Mauna Kea.

## **4.6 SOCIO-ECONOMIC CHARACTERISTICS**

### **4.6.1 Community Profile**

At the time of the 2000 U.S. census, Hawai'i County's population was 148,677, having grown from 120,317 in 1990. At same time, 2,233 people lived in the nearest Census Designated Place (CDP), Honoka'a down from 2,307 in 1990 (DBEDT 2006).

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In general, the population of the Honoka'a CDP is slightly older than Hawai'i County as a whole, and has a racial mix that is significantly less Caucasian and significantly more Asian. Households in the CDP roughly correspond with household types with the exception of having a greater percentage of householders over 65 years old living alone. The CDP has a higher instance of occupied housing units than Hawai'i County as a whole. Median household income is also slightly higher than the County as a whole.

**Table 2. Demographic Characteristics: 2000**

| Subject  | Honoka'a CDP |              | Hawai'i County |              |
|--|--------------|--------------|----------------|--------------|
|  | Number       | Percent      | Number         | Percent      |
| Total Population                                       | 2,233        | 100          | 148,677        | 100.0        |
| <b>AGE</b>   |              |              |                |              |
| Under 5 years  | 142          | 6.4          | 9,130          | 6.1          |
| 5 – 19 years   | 475          | 21.2         | 33,690         | 22.7         |
| 20 – 64 years  | 1,134        | 50.8         | 85,738         | 57.6         |
| 65 years and over                                      | 482          | 21.5         | 20,119         | 13.5         |
| Median Age (years)                                     | 40.2         | —            | 38.6           | —            |
| <b>RACE</b> (alone or in combination with one or more) |              |              |                |              |
| White  | 990          | 44.3         | 77,477         | 52.1         |
| Black or African American                              | 7            | .3           | 1,789          | 1.2          |
| American Indian and Alaska Native                      | 24           | 1.1          | 4,847          | 3.3          |
| Asian  | 1,444        | 64.7         | 70,921         | 47.7         |
| Native Hawaiian and other Pacific Islander             | 490          | 21.9         | 46,111         | 31.0         |
| Other  | 90           | 4.0          | 7,271          | 4.9          |
| <b>HOUSEHOLD (by type)</b>                             |              |              |                |              |
| <b>Total Households</b>                                | <b>761</b>   | <b>100.0</b> | <b>52,985</b>  | <b>100.0</b> |
| Family Households (families)                           | 564          | 74.1         | 36,903         | 69.6         |
| With own children under 18 years                       | 222          | 29.2         | 17,072         | 32.2         |
| Married-couple family                                  | 412          | 54.1         | 26,828         | 50.6         |
| With own children under 18 years                       | 148          | 19.4         | 11,302         | 21.3         |
| Female householder, no husband present                 | 110          | 14.5         | 7,000          | 13.2         |
| With own children under 18 years                       | 52           | 6.8          | 4,095          | 7.7          |
| Non-families   | 197          | 25.9         | 16,082         | 30.4         |
| Living alone   | 176          | 23.1         | 12,240         | 23.1         |
| 65 years and over                                      | 107          | 14.1         | 4,214          | 8.0          |
| Average persons per household                          | 2.88         | —            | 2.75           | —            |
| <b>HOUSING OCCUPANCY AND TENURE</b>                    |              |              |                |              |
| <b>Total Housing Units</b>                             | <b>835</b>   | <b>100.0</b> | <b>62,674</b>  | <b>100.0</b> |
| Occupied units   | 761          | 91.1         | 52,985         | 84.5         |
| By owner   | 499          | 65.6         | 34,175         | 64.5         |
| By renter  | 262          | 34.4         | 18,810         | 35.5         |
| Vacant units   | 74           | 8.9          | 9,689          | 15.5         |
| <b>INCOME IN 1999</b>                                  |              |              |                |              |
| Median household income                                | \$41,964     | —            | \$39,805       | —            |

Source: DBEDT 2006.

### ***Potential Impacts and Mitigation Measures***

The agricultural park is not expected to immediately affect the demographics of the area. The use is anticipated to help contribute to the long term viability of agriculture in the region, positively affecting Hāmākua's population and family incomes. No mitigation measures are planned.

#### **4.6.2 Housing**

There are currently no homes on the site. The homes that exist near the project site are dispersed on large agricultural lots. A more dense concentration of housing exists along Honoka'a-Waipio Road.

### ***Potential Impacts and Mitigation Measures***

Although an increase in agricultural activity would be beneficial, the lack of water and infrastructure will probably limit the intensity of such agricultural uses and it is assumed that any need for housing will be reasonably accommodated by existing housing in the area. Based on the foregoing, no adverse impacts to housing are expected, and no mitigation measures are planned.

#### **4.6.3 The Economy and Employment**

The Hawai'i County General Plan (County of Hawai'i 2005a) discusses the economy of the Hāmākua District, of which the Kapulena Lands are a part. Despite the closing of Hāmākua Sugar in 1994, the population of the Hāmākua region has grown moderately, primarily due to the development of major resorts in the neighboring district of Kohala. The economy has come to depend on cattle, macadamia nuts, and diversified agriculture. There are numerous cattle ranches in Hāmākua and several varieties of crops are grown in addition to macadamia nuts. Investments in the timber industry have also been made in Hāmākua, including a large eucalyptus plantation and a community-based forestry initiative at 'O'ōkala.

Crops grown in the Hāmākua area are taro, watermelon, tomatoes, ginger, kava, coffee, sweet potato and other vegetables. Manufacturing in the area is limited to processing agricultural crops, although there is a 60-megawatt co-generation power plant at Haina that still has the potential to encourage other manufacturing activities (County of Hawai'i 2005a).

The Hāmākua District also encompasses the astrological facilities at Mauna Kea. According to the Hawai'i General Plan, astronomy has contributed over \$619,000,000 to the State's economy and employs 270 permanent positions. These numbers are expected to increase should the Thirty-Meter Telescope (TMT) proposed by a consortium of universities, receive entitlements and be constructed (Hawaii Tribune Herald, 2009).

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**Table 3. Employment Status**

| Subject  | Honoka‘a CDP |         | Hawai‘i County |         |
|--|--------------|---------|----------------|---------|
|  | Number       | Percent | Number         | Percent |
| Population 16 years and older                              | 1,766        | 100     | 114,647        | 100.0   |
| In labor force   | 1,001        | 56.7    | 70,791         | 61.7    |
| Employed Civilian Population                               | 942          | 100     | 64,797         | 100     |
| Service Occupations  | 350          | 37.2    | 14,403         | 22.2    |
| Management and Professional Occupations                    | 193          | 20.5    | 19,607         | 30.2    |
| Sales and Office Occupations                               | 180          | 19.1    | 16,309         | 25.1    |
| Farming, Fishing and Forestry Occupations                  | 31           | 3.3     | 2,449          | 3.8     |
| Construction, Extraction and Maintenance Occupations       | 94           | 10.0    | 6,454          | 9.9     |
| Production, Transportation and Material Moving Occupations | 94           | 10.0    | 5,757          | 8.9     |
| Median household income                                    | \$41,964     | —       | \$39,805       | —       |

Of the residents aged 16 years or older recorded for Honoka‘a CDP in the 2000 census, approximately 57 percent were in the labor force (DBEDT 2005). Of the employed civilian population over the age of 16, 37.2 percent worked in service occupations, 20.5 percent in management and professional occupations and 19.1 percent in sales and office occupations. Smaller numbers worked in production, transportation, and materials moving (10 percent); construction (10 percent); and in farming, fishing and forestry (3.3 percent).

Median household income was \$41,964 for the Honoka‘a CDP. This compares with a median income of \$39,805 for Hawai‘i County and \$49,820 for the state (DBEDT 2005).

For the year 2009, the Hawai‘i County unemployment rate was reported to be 10.3 percent in August, with a statewide unemployment rate of 7.2 percent for the same month. Thus, the employment status of those in Kapulena and surrounding areas may have been affected by the recent economic downturn.

### ***Potential Impacts and Mitigation Measures***

The future potential agricultural use of the lands can only enhance the agricultural economic base of the Hāmākua area. The potential increase in agricultural activity would likely create long term agricultural related jobs.

In light of the economic impact of the closing of Hāmākua Sugar, returning the site to agricultural use consistent with its agricultural zoning would benefit the local economy.

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## **5.0 ASSESSMENT OF THE EXISTING INFRASTRUCTURE AND PUBLIC SERVICES, AND POTENTIAL IMPACTS AND MITIGATION MEASURES**

This chapter discusses the existing infrastructure of the project area and the proposed infrastructure improvements. Mitigation measures have also been identified to address potential impacts.

### **5.1 TRANSPORTATION FACILITIES**

**Existing Roadways.** The site is accessed by private roads from the Honoka‘a-Waipio Road (Highway 240). Honoka‘a-Waipio Road is a two lane road with a paved shoulder of varying width. It serves as the primary access to Waipio Valley. Traffic includes local vehicles, 4-wheel drive tour operators and rented automobiles that are driven by visitors to the Waipio lookout, turn-around and return south through Honoka‘a. The primary access to the Kapulena Lands from the Honoka‘a-Waipio Road is by “Quarry Road”, a paved former cane road maintained by the County. The portion of this road not on County-owned lands is privately owned by Kamehameha Schools (TMK 4-6-5:001 and 4-6-4:007). The County recently obtained an easement from Kamehameha Schools to establish legal rights to use this road through Kamehameha Schools’ property. The portion of the easement that is not a subdivided roadway lot is defined by metes and bounds. This cane road connects to Mud Lane, an unimproved government road. The County obtained easements from Kamehameha Schools and another private owner, Mauka-Makai Corp., to enable access to Mud Lane. Other former cane haul roads on-site that once provided mauka-makai access are heavily overgrown with Guinea grass and appear to be unused or infrequently used for any activity.

#### ***Potential Impacts and Mitigation Measures***

The proposed agricultural park may cause traffic to increase slightly on roads that access the properties to manage the land. Impacts are not, however, expected to be significant. The County will maintain the primary access road to the site, as it presently does. The County has obtained easement rights for the portions of the main access road over private property to resolve any legal access questions. The agricultural park plan includes fencing of this road to protect the public’s safety from entering active cattle paddocks. In order to minimize potential impacts associated with this reduction in access for hunters or other cultural practitioners, two former cane haul roads connecting the Waipio-Honoka‘a Road and the quarry access road have been cleared of Guinea grass and are now more functional. It is expected that at least one of these roads will remain open, providing access for project use and cultural practitioners alike.

### **5.2 WATER SUPPLY FACILITIES**

The Lower Hāmākua Ditch passes through the makai (north) portion of this site. The nearest County of Hawai‘i Department of Water Supply domestic water facility is the Kukuihaele water system located approximately 3,200 feet from the southeast corner of TMK 4-7-006:018. The DWS has stated that they will not allow additional services until extensive water system improvements are made.

#### ***Potential Impacts and Mitigation Measures***

Installation of pumping equipment will be necessary to access water from the Lower Hāmākua Ditch for operations at the lower elevations. Water source development such as a well, reservoir or large-scale water catchment systems will likely be pursued to provide agricultural water at higher elevations. The DWS is not allowing new hookups for domestic service until extensive water improvements are made. There are no plans for any water improvements; therefore, any increased demand for water would need to be met through the use of rainwater-catchment stored in tanks or reservoirs.

### **5.3 WASTEWATER FACILITIES**

There are no wastewater treatment facilities in the vicinity of the project site.

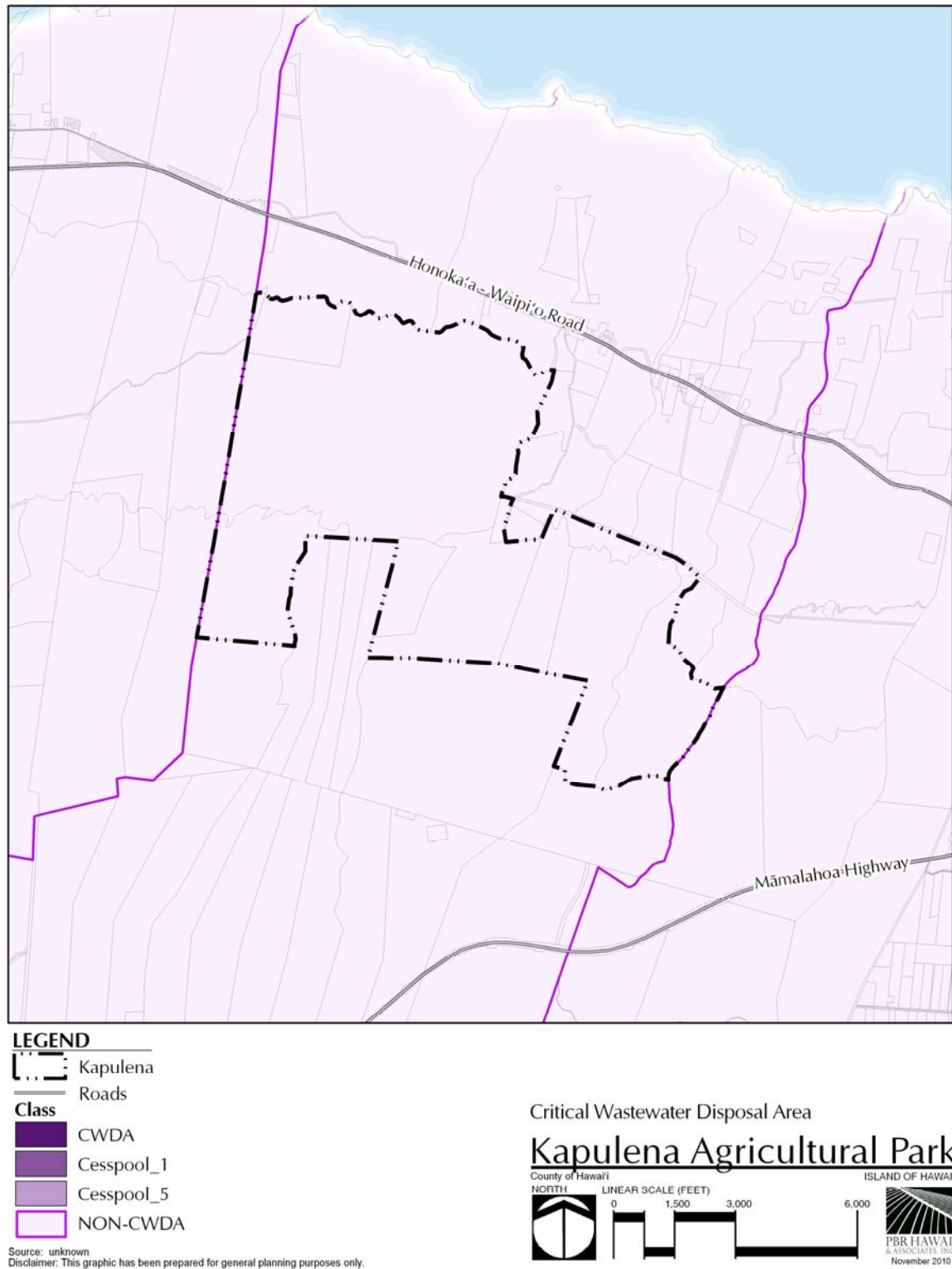
The site is located in a “non-Critical Wastewater Disposal Area (CWDA)”. In non-critical areas, such as the site, cesspools are permitted as long as there are no wells within 1000’. The siting of any future wells for drinking purposes would be subject to the 1000’ buffer from future cesspools on the site. See Figure 12, Critical Wastewater Disposal Area.

#### ***Potential Impacts and Mitigation Measures***

The deep soils in the area would filter, absorb, or adsorb the cesspool leachate before reaching the groundwater table. The depth to the groundwater and the soils overlying the groundwater aquifer were the bases for the Department of Health’s non-critical designation for cesspools in the area.

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Figure 12, Critical Wastewater Disposal Area



## 5.4 DRAINAGE FACILITIES

There are no stormwater drainage facilities at the site or within the vicinity. Precipitation is absorbed by vegetation, infiltrates into site soils and surface flows to the many gulches that cross the site. Hāmākua Ditch runs roughly parallel to the site's north (makai) boundary.

### *Potential Impacts and Mitigation Measures*

The proposed lease of the site is not expected to affect area drainage.

Depending on future land use after the land is leased, drainage improvements in compliance with the Hawai'i County Code, Chapter 10, Sections 25, Drainage and 26, Sediment Control may be required.

## 5.5 SOLID WASTE DISPOSAL FACILITIES

According to the *Update to the Integrated Solid Waste Management Plan for the County of Hawaii*, in 2002, the total amount of solid waste managed by the county system was approximately 160,000 tons (Harding ESE, 2002). The two landfills on the island are the South Hilo Landfill and the Pu'uana'hulu Landfill. The estimated lifespan of the Pu'uana'hulu Landfill, with a 15 percent diversion rate and receiving only West Hawai'i waste, is until the year 2049. If the Pu'uana'hulu Landfill receives all of the county's waste, and if planned recycling and resource recovery efforts progress (potentially increasing the diversion rate to 45 percent), then the Pu'uana'hulu Landfill has capacity until the year 2045. Additionally, the proposed waste reduction technology in East Hawai'i could potentially expand the Pu'uana'hulu Landfill beyond the year 2049 (County of Hawai'i, 2004).

The nearest transfer station is at Honoka'a. The station accommodates household waste and offers recycling facilities. From the transfer station, solid waste is hauled to the County landfill at Pu'uana'hulu. Green waste facilities are located at the Hilo and Kealahou/Kailua Transfer stations.

### *Potential Impacts and Mitigation Measures*

Green waste generated from the onsite agricultural activities will be composted onsite or used for energy generation.

## 5.6 ELECTRICAL FACILITIES

Power supplied by Hawaii Electric Light Company (HELCO) is available in the cane haul road corridor adjacent to TMK 4-7-006:018. The lines terminate short of TMK 4-7-006:020. HELCO facilities are also located along Honoka'a-Waipio Road.

### *Potential Impacts and Mitigation Measures*

Agricultural land uses and educational facilities associated with the Agricultural Park may require electricity service. Should electrical power be desired for the TMKs that are not adjacent to HELCO facilities, one option would be the extension of HELCO facilities and provision of

easements across private property. Other options would be the use of off-the-grid alternatives such as generators and photovoltaic devices.

## **5.7 EDUCATIONAL FACILITIES**

**Public Schools.** The site is located in the Honoka‘a Complex. The nearest elementary school is Honoka‘a Elementary. The site is served by Honoka‘a Intermediate and High School. Official enrollment count for the 2008-2009 school year was 357 total students at Honoka‘a Elementary and 790 total students at Honoka‘a Intermediate and High School.

### ***Potential Impacts and Mitigation Measures***

No impacts are anticipated since farm dwellings will not be allowed.

## **5.8 POLICE PROTECTION**

The Kapulena area is served by the Honoka‘a District Police Station, which is located approximately five miles from the site at 45-3400 Māmane Street, in Honoka‘a. The Honoka‘a police station has a staff of 13 Patrol Officers, one Community Police Officer, two Sergeants, one Police Operations Clerk and the District Captain.

### ***Potential Impacts and Mitigation Measures***

The proposed agricultural park will not directly introduce new residents to the project area and is not anticipated to increase demand for police services.

## **5.9 FIRE PROTECTION**

Fire protective service and rescue services for the Hawai‘i County are provided by the Hawai‘i County Fire Department, which operates 20 regular fire stations and 22 volunteer fire stations. One fire station (at Pōhakuloa) is federally operated. The 20 regular fire stations and three of the volunteer stations (Laupāhoehoe, Pāhala, and Nā‘ālehu) provide 24-hour fire protection and emergency medical services. Emergency medical ambulance services are contracted by the State Department of Health. Fire Department personnel provide basic and advanced life support. Emergency medical services account for 75 percent of all Fire Department incidences. All fire personnel who provide advanced and basic life support possess appropriate certification and licenses (Hawai‘i County 2005). The nearest station to the site is located at 45-3388 Māmane Street, in Honoka‘a, approximately 6.5 miles from the project lands.

The majority of the site is within the County of Hawai‘i response area. However, portions of TMK (3) 4-7-006: 010 is within a cooperative response area between the County and the State of Hawai‘i, DLNR, Division of Forestry and Wildlife (DOFAW).

### ***Potential Impacts and Mitigation Measures***

The proposed lease of the site will not directly increase the need for fire and emergency services in the vicinity.

## **5.10 HOSPITALS AND HEALTH CARE FACILITIES**

Hale Ho‘ōla Hāmākua long-term care facility (formerly Honoka‘a Hospital), at 45-547 Plumaria, Honoka‘a is the primary healthcare facility serving the Hāmākua District. Located approximately 5 miles from the site, Hale Ho‘ōla Hāmākua is an acute and long-term care hospital with 50 beds (4 acute and long-term care and 46 skilled nursing and intermediate care), and 24-hour emergency room services.

North Hawai‘i Community Hospital also serves the area. Located in Waimea, at 67-1125 Māmalahoa Highway, approximately 21 miles from the project area, North Hawai‘i Community Hospital has 39 acute-care beds and offers 24-hour emergency service (NHCW 2009).

### ***Potential Impacts and Mitigation Measures***

The proposed lease will not directly increase the need for healthcare in the vicinity.

## **5.11 RECREATIONAL FACILITIES**

The following recreational facilities are located in the vicinity of the site:

- Kukuihaele Park
- Kukuihaele Landing
- Haina Park in Honoka‘a
- Honoka‘a Landing
- Honoka‘a Park
- Honoka‘a Rodeo Arena
- Pā‘auhau Landing
- Kalōpā State Recreation Area
- Pa‘auilo Gym/Park
- Koholālele Landing

The site is also adjacent to Hāmākua Forest Reserves land. Kohala Forest Reserves land and Pu‘u o ‘Umi Natural Area Reserve is north of the site (beyond Waipi‘o Valley).

### ***Potential Impacts and Mitigation Measures***

The proposed lease of the site itself will not directly affect the population in the project vicinity, access to Hāmākua Forest Reserves land, nor will it dramatically increase the demand for community services or public facilities.



## **6.0 RELATIONSHIP TO POLICIES, PLANS AND CONTROLS**

This section describes the State of Hawai‘i and County of Hawai‘i land use plans, policies, and ordinances relevant to the proposed agricultural park.

### **6.1 STATE OF HAWAII**

#### **6.1.1 State Environmental Impact Statement Law, Chapter 343, Hawai‘i Revised Statutes**

This Environmental Assessment is prepared pursuant to Chapter 343, HRS and Section 11-200-4, HAR, which states that, “the governor, or an authorized representative, whenever an action proposes the use of state/county lands or the use of state/county funds, or, whenever a state agency proposes an action within section 11-200-6(b) shall be the final authority to accept an environmental impact statement.”

Since the proposed project requires the use of county lands and funds, it will comply with applicable provisions of Chapter 343, HRS and Section 11-200-4, HAR. Therefore, the Mayor or designated representative, the County of Hawai‘i, Department of Finance, will act as the Accepting Authority for this Environmental Assessment.

#### **6.1.2 Chapter 205, Hawai‘i Revised Statutes – State Land Use Law**

The State Land Use Law establishes the Land Use Commission (LUC) and gives this body the authority to designate all lands in the state into one of four districts: Urban, Rural, Agricultural, or Conservation. The site’s district designation is Agriculture and is adjacent to lands designated Conservation (Figure 13). No change to the State Land Use Designation for the site is proposed. The proposed land uses for the agricultural park are permitted uses in the Agricultural District.

#### **6.1.3 Section 205A, Hawai‘i Revised Statutes – Coastal Zone Management Program**

The Coastal Zone Management Area as defined in Chapter 205A, Hawai‘i Revised Statutes (HRS), includes all the lands of the state. The objectives of the Hawai‘i Coastal Zone Management (CZM) Program, as set forth in Chapter 205A, include the protection and maintenance of the State’s coastal resources. As the Coastal Zone is defined in Chapter 205A, the site is within the Coastal Zone Management Area; however, the lands are located a mile from the shoreline, at a minimum elevation of approximately 1,000 feet above mean sea level. The following paragraphs discuss the project’s relationship to the objectives and policies of the Coastal Zone Management Program.

The proposed project site is approximately 2.3 miles from the shore and is not expected to have any adverse impacts on Coastal Recreational Resources (205A-2(1)), Coastal Ecosystems (205A-2(4)), or Beach Protection (205A-2(9)). For the same reason, the site will not be subject to potential impacts from Coastal Hazards (205A-2(6)).

The proposed agricultural use of the lands will not adversely impact the area’s Historic Resources (205A-2(2)). Scientific Consultant Services, Inc. (2009) conducted an Archaeological

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Inventory Survey of the project area. Mitigation will be to avoid features that are thought to be temporary habitation sites and the possible remains of a heiau.

The proposed action will not significantly affect the Scenic and Open Space (205A-2(2)) quality of the project area. The site is currently uncultivated open space. The agricultural park is expected to return the lands to agricultural use and may open up views when cleared.

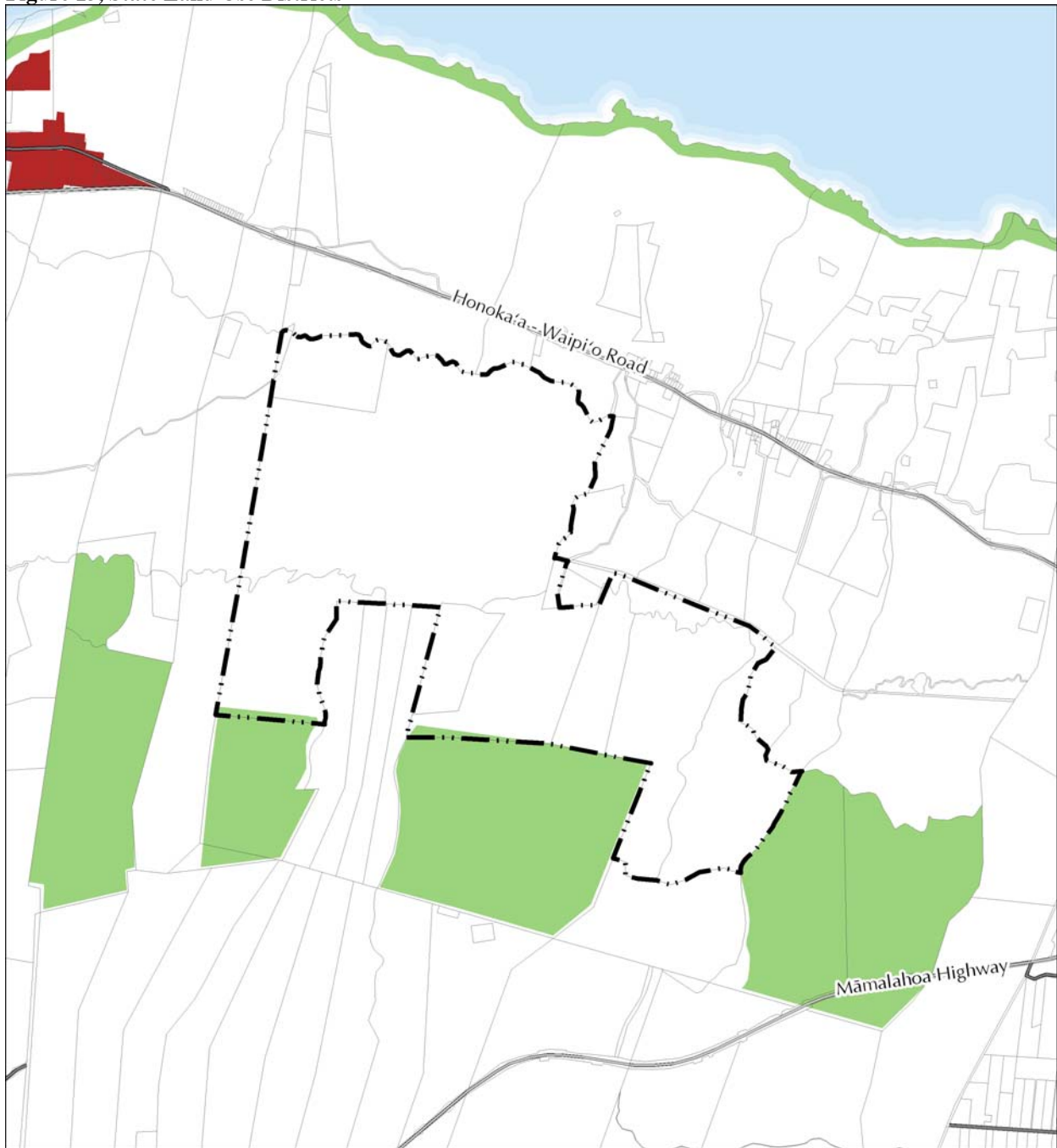
Agricultural use of the site is expected to have a beneficial effect on Economic Use (205A-2(5)). The site is located in an area has long been an agricultural community. This action will make it possible to put these non-coastal lands back into agricultural use after having been fallow for more than a decade. The agricultural park will provide opportunities for residents who wish to be in agriculture to use land for that purpose and enable the production of valuable agricultural commodities.

Regarding the CZM's goals to promote Public Participation in coastal management (205A-2(8)), this EA reports and publishes the potential short- and long-term impacts of the proposed use. Prior to, and throughout the development of this EA, various agencies (or agency documents) were consulted (see consultation list in Section 9.0). Additionally, several members of the community were interviewed for the Cultural Resources Impact Assessment.

Managing development is appropriately the role of those State and County agencies assigned the responsibility of implementing the provisions of Chapter 205A, HRS, and the Coastal Zone Management Program. A major component of the Hawai'i Coastal Zone Management Program is the designation of Special Management Areas (SMA). The Counties determine the extent of the Special Management Areas within their jurisdictions and must approve and issue a permit for any development within the SMA. The site is not located within Hawai'i County SMA and no permit will be required.

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**Figure 13, State Land Use Districts**



## LEGEND

Kapulena

Roads

### District

Agriculture

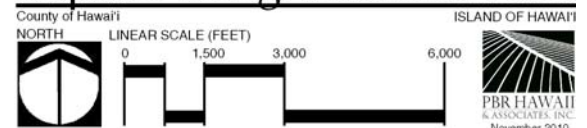
Conservation

Urban

Source: State Land Use Commission (2009)  
Disclaimer: This graphic has been prepared for general planning purposes only.

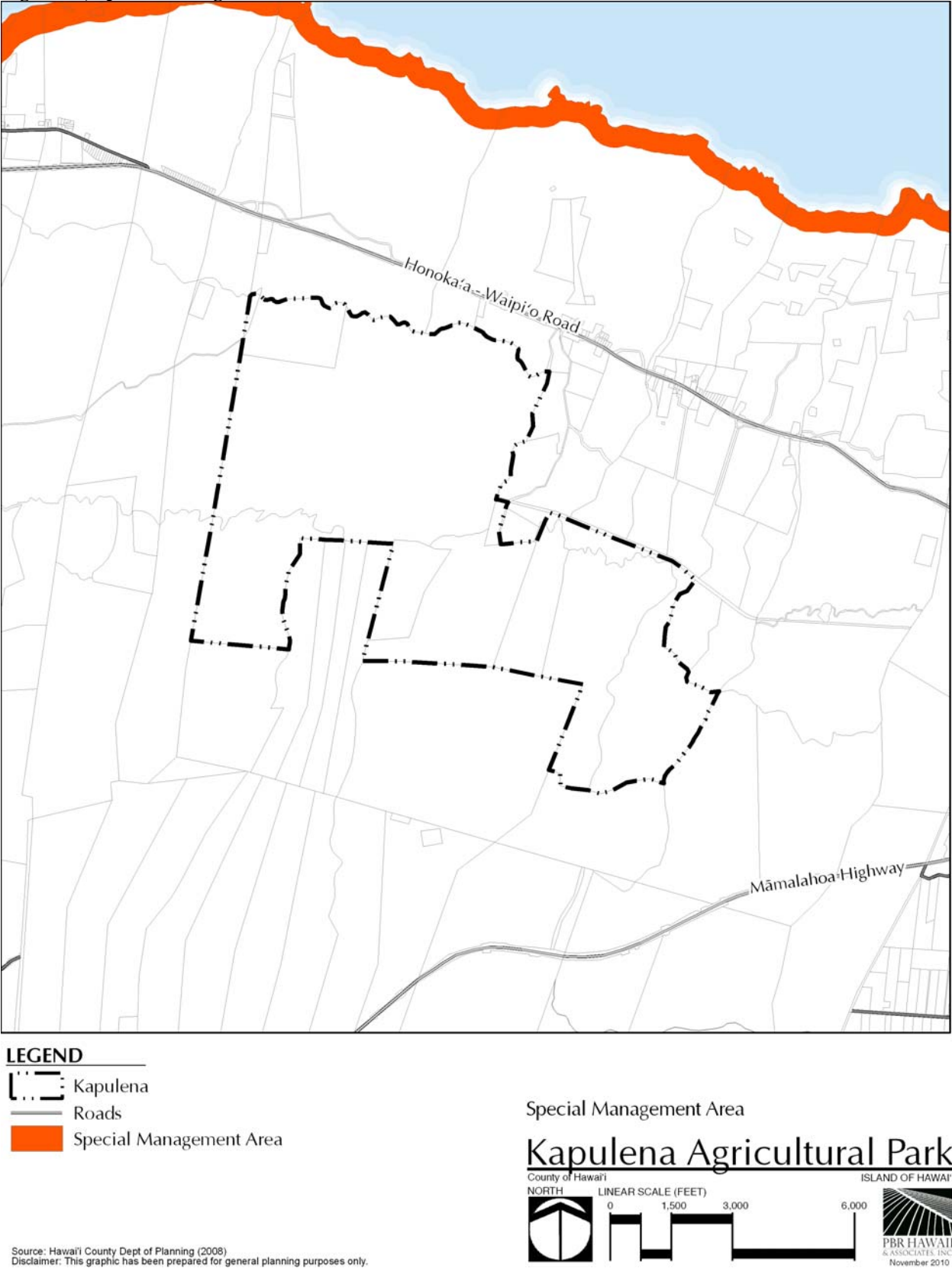
State Land Use Districts

## Kapulena Agricultural Park



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Figure 14, Special Management Area



## 6.2 COUNTY OF HAWAII

County-specific land use plans and ordinances pertaining to the site include the *County of Hawaii General Plan* and the Hawai'i County Zoning Code. The following subsections present relevant elements of these land use plans and ordinances, accompanied with a description of how each will be addressed during the course of the proposed project.

### 6.2.1 General Plan

The *County of Hawaii General Plan* (General Plan) was adopted in February 2005 and is a policy document for the long-range comprehensive development of the Island of Hawai'i. The plan provides direction for the future growth of the County and offers policy statements that embody the expressed goals for present and future generations. The General Plan provides the legal basis for all subdivision, zoning, and related ordinances and for the initiation and authorization of all public improvements and projects.

Specific goals and policies applicable to the proposed lease are discussed below.

#### **Natural Beauty**

##### **Goals:**

- (a) *Maximize opportunities for present and future generations to appreciate and enjoy natural and scenic beauty.*
- (b) *Protect scenic vistas and view planes from becoming obstructed.*

**Discussion:** The site offers views of Mauna Kea, the coastline, and ocean, however, the General Plan does not recognize this site as a specific site of natural beauty. As previously discussed, the agricultural use of the lands is expected to preserve scenic places and vistas in the area.

#### **Environmental Quality**

##### **Goals**

- (b) *Maintain and, if feasible, improve the existing environmental quality of the island.*

##### ***Policies***

- (a) *Take positive action to further maintain the quality of the environment.*

**Discussion:** The proposed agricultural use involves minimal construction or development activity. The lands are expected to retain their current Agriculture zoning, and no significant environmental impacts are expected.

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## **Natural Resources**

### **Goals**

- (a) *Protect and conserve the natural resources from undue exploitation, encroachment and damage.*
- (c) *Protect and promote the prudent use of Hawaii's unique, fragile, and significant environmental and natural resources.*

### **Policies**

- (g) *Promote sound management and development of Hawaii's land and marine resources for potential economic benefit.*

**Discussion:** Among the natural resources of Hawai'i are its soil, water, and air. The site is in the state land use Agricultural District, is zoned by the County for Agriculture, and contain land rated as Prime Agricultural Lands. The proposed use as an agricultural park will utilize the soil resources that have been fallow these past years. Negative impacts to air and water quality and to soils are not expected.

## **Economic**

### **Goals**

- (a) *Provide residents with opportunities to improve their quality of life through economic development that enhances the County's natural and social environments.*
- (b) *Economic development and improvement shall be in balance with the physical, social, and cultural environments of the island of Hawaii.*
- (d) *Provide an economic environment that allows new, expanded, or improved economic opportunities that are compatible with the County's cultural, natural and social environment.*

### **Policies**

- (a) *Assist in the expansion of the agricultural industry through the protection of important agricultural lands, development of marketing plans and programs, capital improvements and continued cooperation with appropriate State and Federal agencies.*

**Discussion:** Agricultural activities ceased at this site with the default of Hamakua Sugar and subsequent ownership of the land by the County. The proposed agricultural park will make it possible to put the lands back into agricultural use, by making it available for residents who wish to be in agriculture to use land for that purpose. Putting the lands back into agriculture is consistent with the physical, social, and cultural environment of Hawai'i and the Hāmākua District.



## **Land Use – Agriculture**

### **Goals**

- (a) *Identify, protect and maintain important agriculture lands on the island of Hawai‘i.*

### **Policies**

- (j) *Ensure that development of important agricultural land be primarily for agricultural use.*

**Discussion:** The site is former sugar cane land that has lain fallow since 1994.

On the county’s Land Use Pattern Allocation Guide (LUPAG) map, found in the Hawai‘i County General Plan (Hawai‘i County 2005), the site is designated Important Agricultural Lands (Figure 15, Land Use Pattern (General Plan)). Because the site is expected to return to agricultural use, the proposed lease is consistent with the Important Agricultural Lands designation.

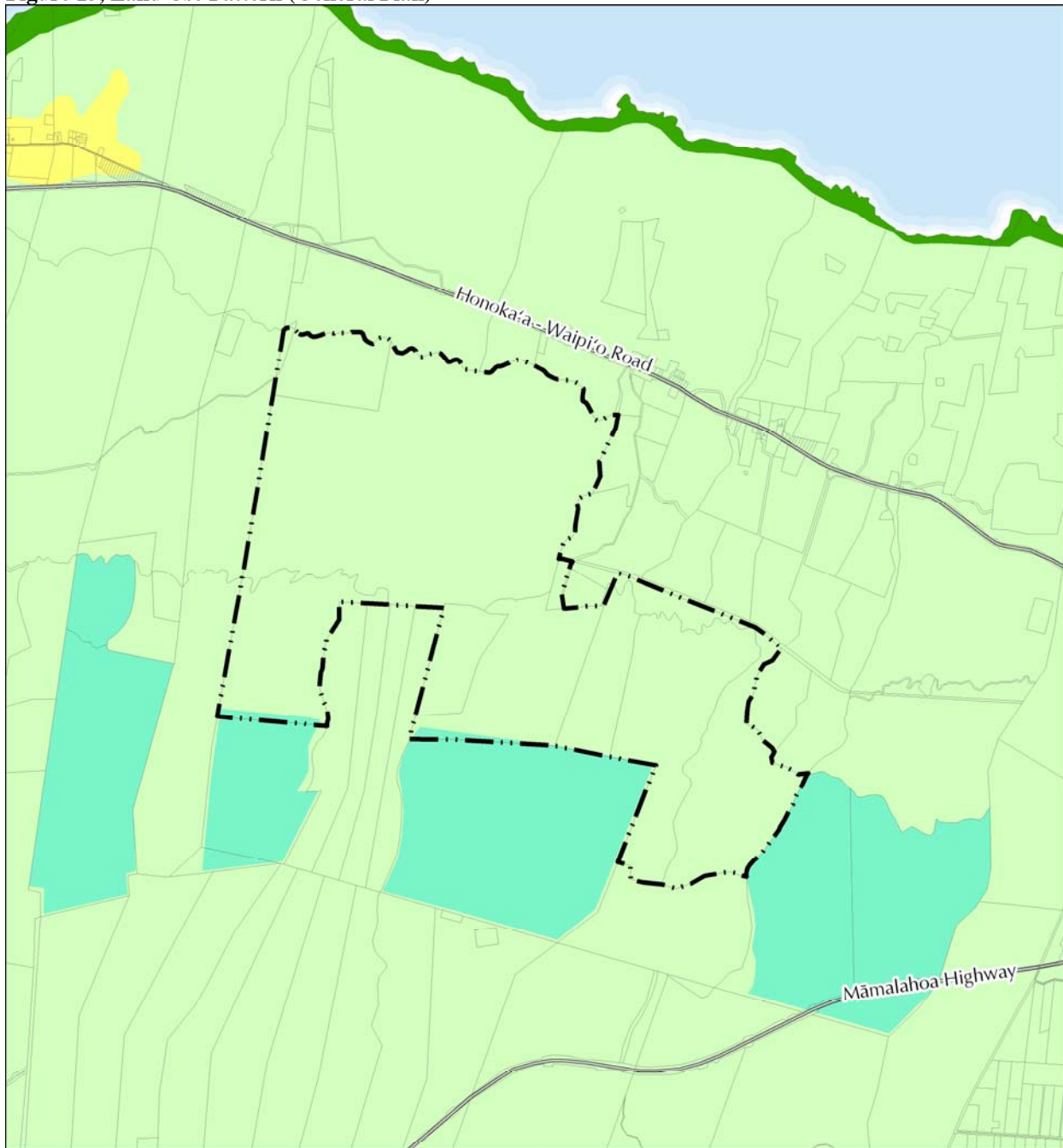
### **6.2.2 Hawai‘i County Zoning**

Chapter 25 of the Hawai‘i County Code is the County’s Zoning Code. The Zoning Code specifies permitted uses as well as site development parameters, such as density and building setbacks. All of the TMKs that comprise the site are zoned A-40a by the County of Hawai‘i (Figure 16, Zoning). Agricultural districts provide for agricultural and very low-density agriculturally-based residential use. Density in the A-40a District is limited to a minimum building site area of 40 acres.

**Discussion:** The lease of the site is consistent with the Agricultural district. It is anticipated that the site will continue to be designated Agriculture and that agricultural uses can once again resume at the site.

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**Figure 15, Land Use Pattern (General Plan)**



## LEGEND

- Kapulena
- Roads

## LUPAG Land Classification

- Low Density Urban
- Important Agricultural Lands
- Open Area
- Conservation

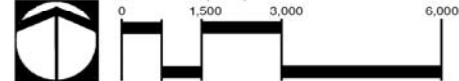
Source: Hawai'i County Dept. of Planning (2005)  
Disclaimer: This graphic has been prepared for general planning purposes only.

## Land Use Pattern Allocation Guide

## Kapulena Agricultural Park

County of Hawai'i

NORTH LINEAR SCALE (FEET)

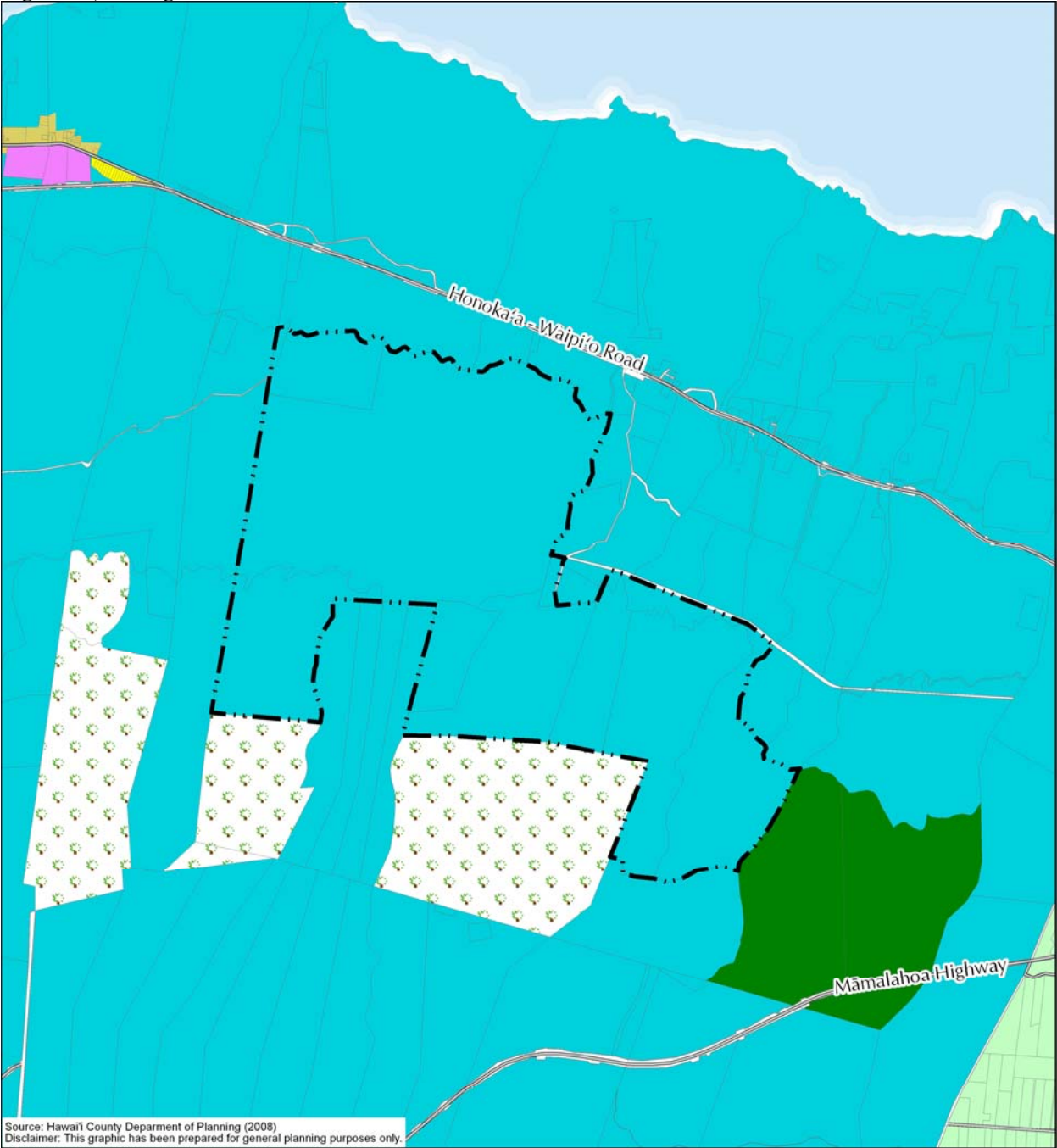


ISLAND OF HAWAII



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Figure 16, Zoning



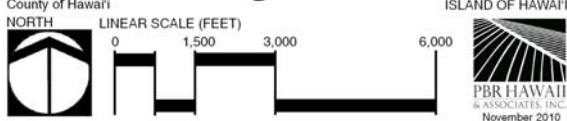
LEGEND

|               |          |
|---------------|----------|
|               | Kapulena |
|               | Roads    |
| <b>Zoning</b> |          |
|               | (road)   |
|               | A-40a    |
|               | A-5a     |
|               | FR       |

|  |        |
|--|--------|
|  | OPEN   |
|  | RS-15  |
|  | RS-7.5 |
|  | V-25   |

County of Hawai'i Zoning

Kapulena Agricultural Park



### **6.3 MAJOR APPROVALS REQUIRED**

Since the proposed agricultural park is a permitted use under existing land use designations, no major approvals are required. The conservation plan is a requirement to undertake grading for agricultural purposes under the County's erosion and sedimentation control code (Hawai'i County Code section 10-3).

## **7.0 ALTERNATIVES TO THE PROPOSED ACTION**

Under Section 11-200-10(6), HAR, Environmental Impact Statement Rules, the alternatives to the proposed action considered are limited to those that would allow the objectives of the project to be met, while minimizing potential adverse environmental impacts. The feasible alternatives must also address the project's economic characteristics while responding to the surrounding land uses that will be impacted by the project. In conformance with applicable regulations, the following alternatives, including alternative sites and uses of the property, have been identified and investigated.

### **7.1 NO-ACTION ALTERNATIVE**

Under the no-action alternative the County would retain ownership of the site TMKs. The County would continue to pay expenses associated with owning the lands and not realize the benefits of leasing or selling the lands. Under this alternative, the lands would continue to be property-tax exempt and the County will not realize any income from taxes. In addition, the lands would not pass to new land managers capable of agricultural operations and would not be put to their best use. Thus, the no-action alternative has been rejected from further consideration.

### **7.2 THE ALTERNATIVE OF EXECUTING A LAND EXCHANGE**

Over the last few years, the County has explored land exchange options for its other surplus properties with large landowners in the vicinity. None of the parties involved could come to a mutually agreeable decision, therefore, this alternative is considered to be a viable option for this site at this time.

### **7.3 THE ALTERNATIVE OF SELLING THE LANDS**

The County considered the option of selling the lands to achieve three purposes; making the land available for productive use; realize funding through land sale profits; and, generation of real property tax revenues once the lands were held privately. However, as this option was considered, the community objective to promote agriculture gained traction and it was determined that the land has value that merits the County continuing retaining it in public ownership. Thus, the alternative of selling the land was rejected in favor of maintaining public ownership and a higher level of control over the property. In lieu of selling or exchanging, the County has decided to forego generating revenues as a primary objective and instead to use this County asset to pursue community objectives in terms of promoting agriculture.

### **7.4 THE ALTERNATIVE OF LEASING THE LANDS**

The County also considered leasing the lands directly to agricultural users. However, this alternative requires a greater level of effort on behalf of County staff to administer the day-to-day details of an agricultural lease. The County recognizes that there are other entities, such as the Farm Bureau, that are better equipped to manage an agricultural park and that partnerships with agricultural and educational entities facilitate agricultural experimentation and education. Thus, the proposed action involving partnerships is a more refined alternative than the County leasing land to individual farmers or non-agricultural users.

## **7.5 ACTIONS OF A SIGNIFICANTLY DIFFERENT NATURE WHICH WOULD PROVIDE SIMILAR BENEFITS WITH DIFFERENT ENVIRONMENTAL IMPACTS**

There are no known actions significantly different than the proposed agricultural park that would free the County from paying the expenses associated with owning and administering the lands and achieve the community objective to promote agriculture, while retaining a level of management control in the public interest.

## **7.6 THE ALTERNATIVE OF POSTPONING ACTION PENDING FURTHER STUDY**

The County has evaluated the site in the context of its short-term and long-term plans and goals and has determined that allowing the lands to lie fallow does not further those plans and goals. The County believes that it has evaluated all reasonable alternatives.



## **8.0 ANTICIPATED DETERMINATION, FINDINGS, AND REASONS FOR SUPPORTING DETERMINATION**

This EA has evaluated the potential primary, secondary, and cumulative environmental impacts, both short-term and long-term, that could result from the lease of the site. Based on an assessment of existing research, a Finding of No Significant Impact (FONSI) is anticipated.

### **8.1 SIGNIFICANCE CRITERIA**

According to the Significance Criteria contained in Section 11-200-12, HAR, an applicant or agency must determine whether an action may have a significant impact on the environment, including all phases of the project, its expected consequences both primary and secondary, its cumulative impact with other projects and its short-term and long-term effects. The HAR establish “significance criteria” to determine whether significant environmental impact will occur as a result of a proposed action. An action shall be determined to have a significant impact on the environment if it meets any one of the following criteria:

**(1) Involves an irrevocable commitment to loss or destruction of any natural or cultural resources**

The agricultural park and its anticipated subsequent use are not expected to negatively impact natural resources in the lands or in the vicinity. While the lands are expected to remain in agriculture, the exact use and any associated impacts are unknown at this time. Lessees would have to comply with County, State, and federal regulations with regard to the protection of natural resources.

An archaeological inventory survey has been conducted by Scientific Consultant Services, Inc., for the project area and has been coordinated with the SHPD. The survey documented 17 sites containing 28 features, the majority of which are associated with Historic-era sugar plantation field clearing activities. Four of the sites were rock shelters that were likely used intermittently for temporary habitation during the pre-Contact era. One site was a disturbed multi-tier platform that might be the remains of a heiau known to have existed in Kapulena Ahupua‘a. Mitigation is avoidance of the temporary habitation sites and of the possible heiau site.

An inventory of flora and fauna was conducted in 2009. No plant species listed or proposed as threatened or endangered were identified within the project area. Faunal survey recorded the presence of the endangered Hawaiian hoary bat within the project area. The faunal survey report concluded that due to the migrant nature of the Hawaiian hoary bat and the abundant habitat in the Hāmākua District, the proposed agricultural use of the site is not expected to have any significant adverse impact on this species.

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**(2) Curtails the range of beneficial uses of the environment**

The site is currently undeveloped and unused land designated by the State and County for agricultural uses. By developing an agricultural park and associated partnerships, the County will be able to facilitate the return to productive agricultural use.

**(3) Conflicts with the State's long-term environmental policies or goals and guidelines as expressed in Chapter 344, HRS; and any revisions thereof and amendments thereto, court decisions, or executive orders**

The proposed agricultural park is consistent with the environmental policies, goals, and guidelines established in Chapter 344, HRS, State Environmental Policy. This EA has addressed such issues as natural resources conservation, soils, drainage, visual environment, flora and fauna, open space, air and water quality, wastewater, and energy consumption.

**(4) Substantially affects the economic welfare, social welfare, or cultural practices of the community or state**

This EA has addressed questions of population, housing, educational facilities, economic development, quality of life, noise, and transportation. The proposed agricultural park will positively affect the economic and social welfare of the Hāmākua community by providing the opportunity To develop and demonstrate best practices for sustainable and efficient grazing operations to support the grass-fed beef industry; to test alternative orchard crops for larger scale production; to test and provide incubator opportunities for value-added products; and to train farmers and processors in cultivation and business practices at different scales from family to larger-scale operations, with an emphasis to strengthen the family-farm based agricultural community in Hāmākua.

**(5) Substantially affects public health**

The proposed agricultural park will not substantially affect public health in the immediate area or island wide. The lands are expected to retain their current zoning and any future agricultural uses will be required to comply with State adopted standards for sanitation and waste disposal.

**(6) Involves substantial secondary impacts, such as population changes or effects on public facilities**

The agricultural park will not create a demand for public facilities. Farm dwellings are not expected to be permitted with the agricultural park due to the lack of infrastructure available to the site.

**(7) Involves a substantial degradation of environmental quality**

The agricultural park will not degrade environmental quality. Construction of structures to support the agricultural park will be subject to applicable County building permits. Similarly, processing facilities, if developed, will be subject to Department of Health

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regulations, as applicable. Site work during construction will include best management practices to control sedimentation and protect waterways from pollutants.

**(8) Is individually limited but, cumulatively, has considerable effect on the environment, or involves a commitment for larger actions**

The agricultural park is anticipated to stimulate a return to agricultural activity for this property. Agricultural use of the lands is not expected to result in cumulative effects on the environment or involve a commitment for larger actions.

**(9) Substantially affects a rare, threatened, or endangered species or its habitat**

The endangered Hawaiian hoary bat was recorded within the project area during the faunal survey. Because this species are common in the Hāmākua region, and habitat is abundant, the anticipated agricultural use is not expected to result in adverse impacts to this species.

**(10) Detrimentially affects air or water quality or ambient noise levels**

The agricultural park will not significantly affect noise and air quality levels. Once leased, traffic on area roads is expected to increase somewhat as the roads will be used by those using the property. However, substantial detrimental impacts to air quality are not expected, as any air pollutants would be rapidly dispersed by the prevailing winds. Periodic vehicular traffic associated with use of the lands may periodically contribute to ambient noise levels in the immediate vicinity of area roads. Any processing facilities that would be developed within the park would be subject to Department of Health air and water quality requirements.

**(11) Affects or is likely to suffer damage by being located in an environmentally sensitive area, such as a flood plain, tsunami zone, beach, erosion-prone area, geologically hazardous land, estuary, freshwater, or coastal waters**

The site is not located in an environmentally sensitive area, such as a flood plain, tsunami zone, beach, erosion-prone area, geologically hazardous land, estuary, fresh water, or coastal waters. As such, the agricultural park and subsequent use of the lands would have no adverse impacts upon such areas, and the lands and any improvements to them would not be likely to suffer damage from hazards associated with such areas.

**(12) Substantially affects scenic vistas and view planes identified in county or state plans or studies**

The property is not identified as exceptional in State or County plans. However, the project vicinity includes a diverse range of scenic vistas and open expanses that typify the upper Hāmākua coast. The site is located at higher elevations and offer views of the coastline. Existing views of the coastline from within the lands would be unaffected by the land lease and could potentially be improved should clearing of the ironwood trees occur.

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In the Agricultural zoning districts, residential structures are limited to 35 feet in height and other agricultural structures are limited to 45 feet in height. Thus, any new structures built on the property are not expected to significantly affect views of the coast or to degrade views of the slopes of Mauna Kea from makai areas.

**(13) Requires substantial energy consumption.**

The proposed agricultural park will not substantially increase energy consumption. With the lease, the lands are expected to be put to agricultural use. Because no utility upgrades are planned, off-the-grid alternatives such as generators and photovoltaic devices will need to be considered should any construction or need for power be necessary.

## 9.0 CONSULTED PARTIES AND PARTICIPANTS

### 9.1 PRE-ASSESSMENT CONSULTATION PERIOD

Pre-consultation letters, along with a location map, were distributed to the agencies and organizations listed in the following table prior to development of this Environmental Assessment. Agency comment letters and responses are included in Appendix E.

| AGENCY                     |   | Letter Date | Provided Comments (yes/no) |
|----------------------------|---|-------------|----------------------------|
| <b>County</b>              |   |             |                            |
| 1                          | Department of Environmental Management                            | 08/07/2009  | yes                        |
| 2                          | Planning Department   | 08/07/2009  |                            |
| 3                          | Department of Public Works  | 08/07/2009  |                            |
| 4                          | Department of Research and Development                            | 08/07/2009  |                            |
| 5                          | Department of Water Supply  | 08/07/2009  |                            |
| 6                          | Fire Department   | 08/07/2009  | yes                        |
| 7                          | Police Department   | 08/07/2009  | yes                        |
| 8                          | J. Yoshimoto, Chair, County Council                               | 08/07/2009  |                            |
| 9                          | Dominic Yagong, Councilmember                                     | 08/07/2009  |                            |
| 10                         | Office of the Mayor   | 08/07/2009  |                            |
| <b>State</b>               |   |             |                            |
| 11                         | Department of Business, Economic Development and Tourism (DBEDT)  | 08/07/2009  |                            |
| 12                         | DBEDT Land Use Commission   | 08/07/2009  |                            |
| 13                         | DBEDT Office of Planning  | 08/07/2009  | yes                        |
| 14                         | DBEDT Strategic Industries Division                               | 08/07/2009  | yes                        |
| 15                         | Department of Health – Environmental Planning Office              | 08/07/2009  |                            |
| 16                         | Department of Land and Natural Resources (DLNR)                   | 08/07/2009  | yes                        |
| 17                         | DLNR State Historic Preservation Division                         | 08/07/2009  | yes                        |
| 18                         | Office of Environmental Quality Control                           | 08/07/2009  | yes                        |
| 19                         | Office of Hawaiian Affairs  | 08/07/2009  | yes                        |
| 20                         | Office of Hawaiian Affairs – Kona Office                          | 08/07/2009  |                            |
| 21                         | U.H. Mānoa College of Tropical Agriculture and Human Resources    | 08/07/2009  |                            |
| <b>Federal</b>             |   |             |                            |
| 22                         | US Army Corps of Engineers, Honolulu District – Regulatory Branch | 08/07/2009  |                            |
| 23                         | US Fish and Wildlife Service – Pacific Islands Contact Office     | 08/07/2009  |                            |
| <b>Other Organizations</b> |   |             |                            |
| 24                         | Kamehameha Schools – Land Assets Division                         | 08/07/2009  |                            |

KAPULENA AGRICULTURAL PARK  
DRAFT ENVIRONMENTAL ASSESSMENT

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KAPULENA AGRICULTURAL PARK  
DRAFT ENVIRONMENTAL ASSESSMENT

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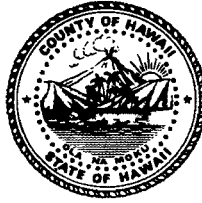
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Appendix

A

{ Pre-Existing Lots of Record Determination }

**William P. Kenoi**  
*Mayor*



**Bobby Jean Leithead Todd**  
*Planning Director*

**Margaret K. Masunaga**  
*Deputy Planning Director*

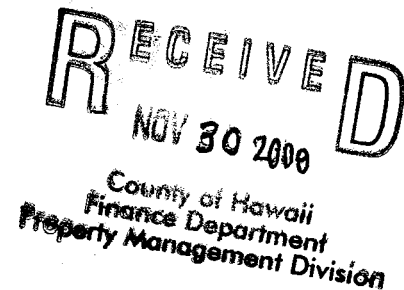
County of Hawaii

**PLANNING DEPARTMENT**

Aupuni Center • 101 Pauahi Street, Suite 3 • Hilo, Hawaii 96720  
Phone (808) 961-8288 • Fax (808) 961-8742

November 24, 2009

Kenneth J. Van Bergen, Property Manager  
County of Hawai'i Finance Department  
25 Aupuni Street, Suite 118  
Hilo, HI 96720



Dear Mr. Van Bergen:

**PRE-EXISTING LOTS OF RECORD DETERMINATION (PRE-X SUBDIVISION No. 14)  
Malanahae, Kapoaula, Hauko, Keahakea, Kaauhuhu, Kapulena, Waialeale 1<sup>st</sup> & 2<sup>nd</sup>,  
Waikoloa, Niupuka and Hanapai, Hāmākua, Hawai'i  
TMK: 4-7-005:001, 002, 003; 4-7-006:001, 005, 006, 007, 010, 018 and 020**

This acknowledges receipt of your request of September 28, 2009, regarding the determination of pre-existing lots within the subject TMK parcels. Please pardon the delay but as you will see, there was some difficulty determining the actual properties that are present within the referenced parcel numbers.

First of all, be informed that the past practices of the State Bureau of Conveyances (BOC) with regard to the methods of recording land ownership documents has not always been in agreement with County subdivision law. Prior to the mid 1990's, it was a simple matter of presenting properly prepared deed documents and/or subdivision plats to the BOC and they would be recorded and subsequently indicated on the Tax Map Plats giving the appearance of legally subdivided land. These maps are for property tax assessment purposes only and do not necessarily reflect the proper creation of lots as specified in county law. For example, we do not say that the fact that many grants are contained within a single tax map parcel—as happened in TMK No. 4-7-005:001—had the effect of consolidating the grants. The contrary is also true: the fact that one grant was put in two tax map parcels did not necessarily, in itself, subdivide the grant into two lots.

Kenneth J. Van Bergen, Property Manager  
County of Hawai'i Finance Department  
Page 2  
November 24, 2009

We have reviewed our department records and those of the Department of Finance – Real Property Tax Division (RPT) in accordance with Article 11 (Pre-existing Lots) of the Subdivision Code (Sections 23-117 through 23-120).

By way of Commissioner's Quitclaim Deed to the County of Hawai'i dated May 9, 1995, and filed as Document No. 95-061558, we have determined that the various Grants, Land Commission Awards, Mahele Awards, etc., within the subject parcels represent the following thirty-two (32) pre-existing lots of record:

TMK 4-7-005:001

- 1) The Whole of Grant 1883
- 2) The Whole of Grant 1768
- 3) The Whole of Grant 1764
- 4) The Whole of Grant 1770
- 5) A Portion of Grant 1564
- 6) A Portion of Grant 1765
- 7) A Portion of Grant 791
- 8) A Portion of Grant 868
- 9) A Portion of Grant 670
- 10) A Portion of Land Commission Award 9971 Apana 4
- 11) A Portion of Land Commission Award 9971 Apana 8

TMK 4-7-005:002

- 12) A Portion of Grant 1882
- 13) A Portion of Grant 1776

TMK 4-7-005:003

- 14) A Portion of Grant 1882

TMK 4-7-006:001

- 15) A Portion of Grant 2449
- 16) A Portion of Land Commission Award 9971 Apana 2

TMK 4-7-006:005

- 17) A Portion of Grant 2123

TMK 4-7-006:006

- 18) A Portion of Grant 2124
- 19) A Portion of Grant 670

\*\*\***(w/Parcel 006:007, illegal subdivision)**\*\*\*

TMK 4-7-006:007

- 20) A Portion of Grant 2124

\*\*\***(w/Parcel 006:006, illegal subdivision)**\*\*\*

TMK 4-7-006:010

- 21) The Whole of Grant 1763
- 22) The Whole of Grant 1767
- 23) A Portion of Grant 1564
- 24) A Portion of Grant 1765
- 25) A Portion of Grant 791
- 26) A Portion of Land Commission Award 9971 Apana 4

TMK 4-7-006:018 (Lot 16)

- 27) A Portion of Grant 4003
- 28) A Portion of Grant 2123
- 29) A Portion of Grant 2449
- 30) A Portion of Land Commission Award 9971 Apana 2
- 31) A Portion of Mahele Award 4-B

TMK 4-7-006:020

- 32) A Portion of Grant 4012

This determination does not, however, verify the ownership of all of these lots. For instance, on August 20, 1991, the affidavit of Herbert Napuakalani Pratt, Jr. was recorded with the State of Hawai'i Bureau of Conveyances that claims ownership of the **whole** of Grant 2123 of which parcel 4-7-006:005 is a part.

Those that were noted in **\*\*\*bold\*\*\*** are for informational purposes since the parcel numbers may not have been legally created by subdivision but are counted because of having been specifically included in the Quitclaim Deed.

We understand that after receiving this pre-existing lot determination, you may submit an application to consolidate and resubdivide these properties. We will require proof of title for any lots being consolidated and resubdivided, such as a title report, to avoid the problems that will occur if lots with bad title are consolidated into other properties.

If consolidation and resubdivision is not the intent, you may want to have a modern metes and bounds survey conducted for a more accurate and current land area determination and that a map reflecting this information may be submitted to this department for certification.

Any request for additional Tax Map Parcel Numbers should be in writing to our Tax Maps and Records Section.

Kenneth J. Van Bergen, Property Manager  
County of Hawai'i Finance Department  
Page 4  
November 24, 2009

Should you have any questions, please feel free to contact Jonathan Holmes of this department.

Sincerely,



BJ LEITHEAD TODD  
Planning Director

JRH:jrh/lrm

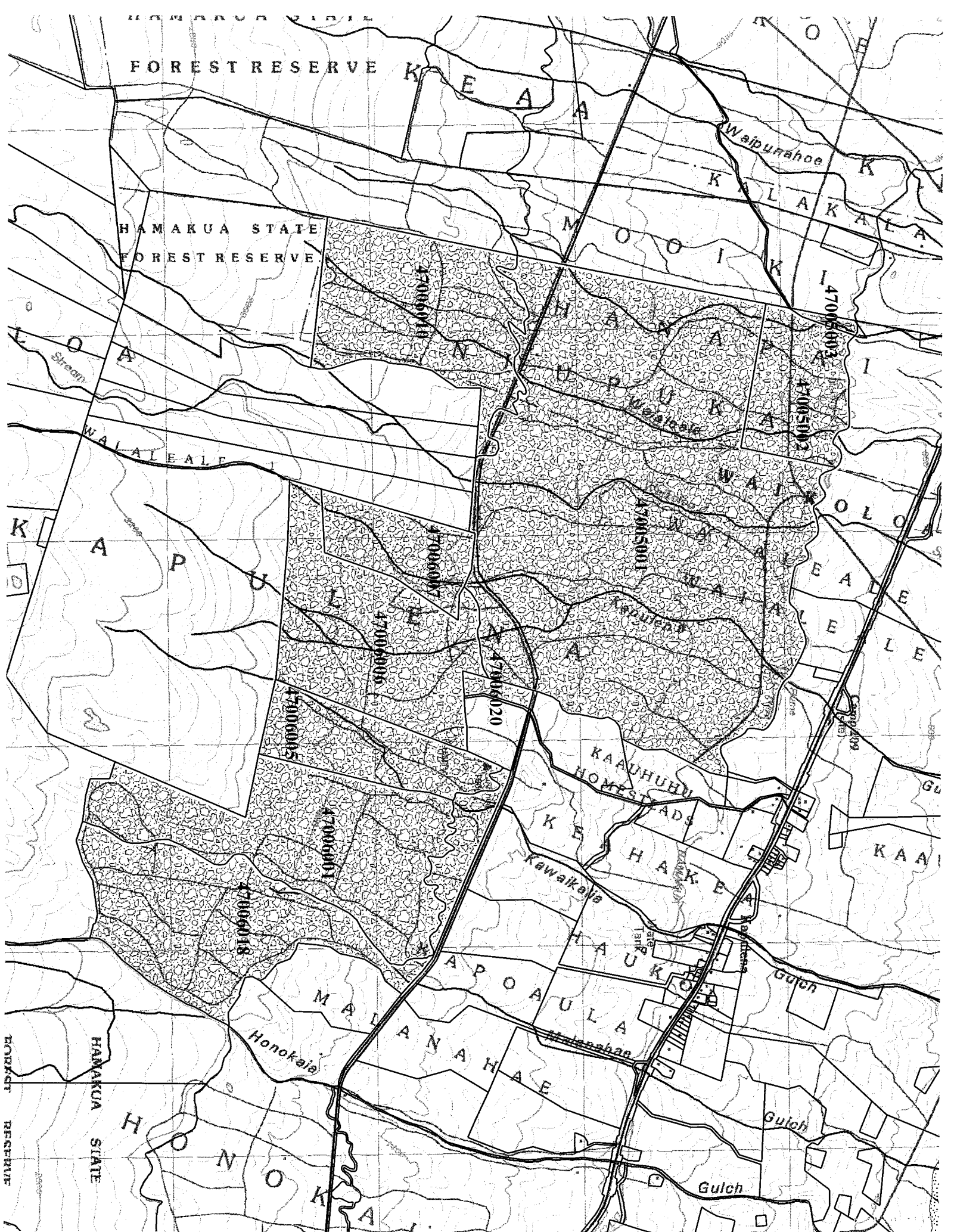
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Encs.: Tax Map Plat w/Pre-existing Lots  
GIS Reference Map

xc: Tax Maps and Records Supervisor w/maps  
Real Property Tax Division-Hilo w/maps  
Manager-DWS w/maps  
Director, DPW w/maps  
TMK File 4-7-5:1 w/maps

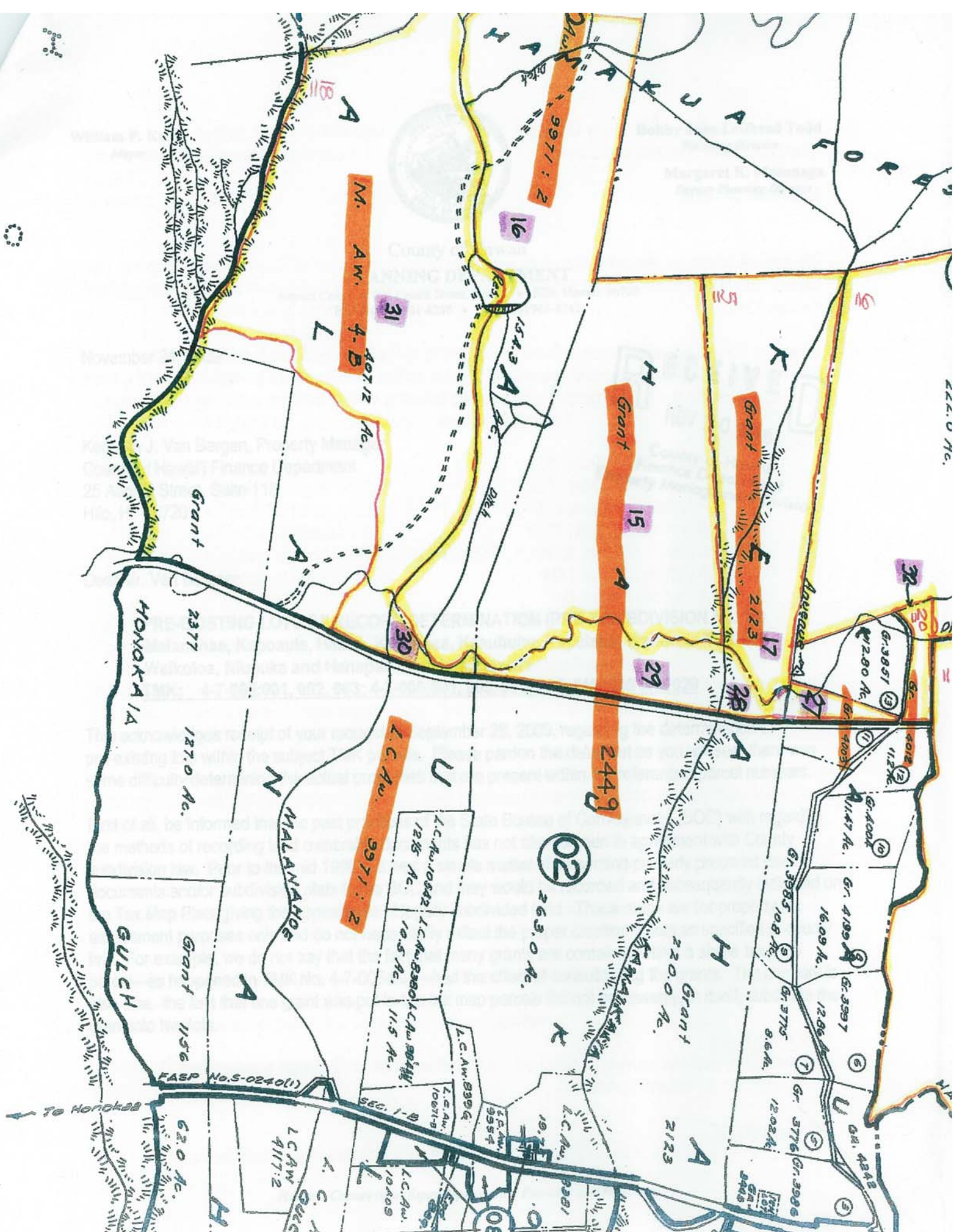
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FOREST RESERVE

HAMAKUA STATE  
FOREST RESERVE

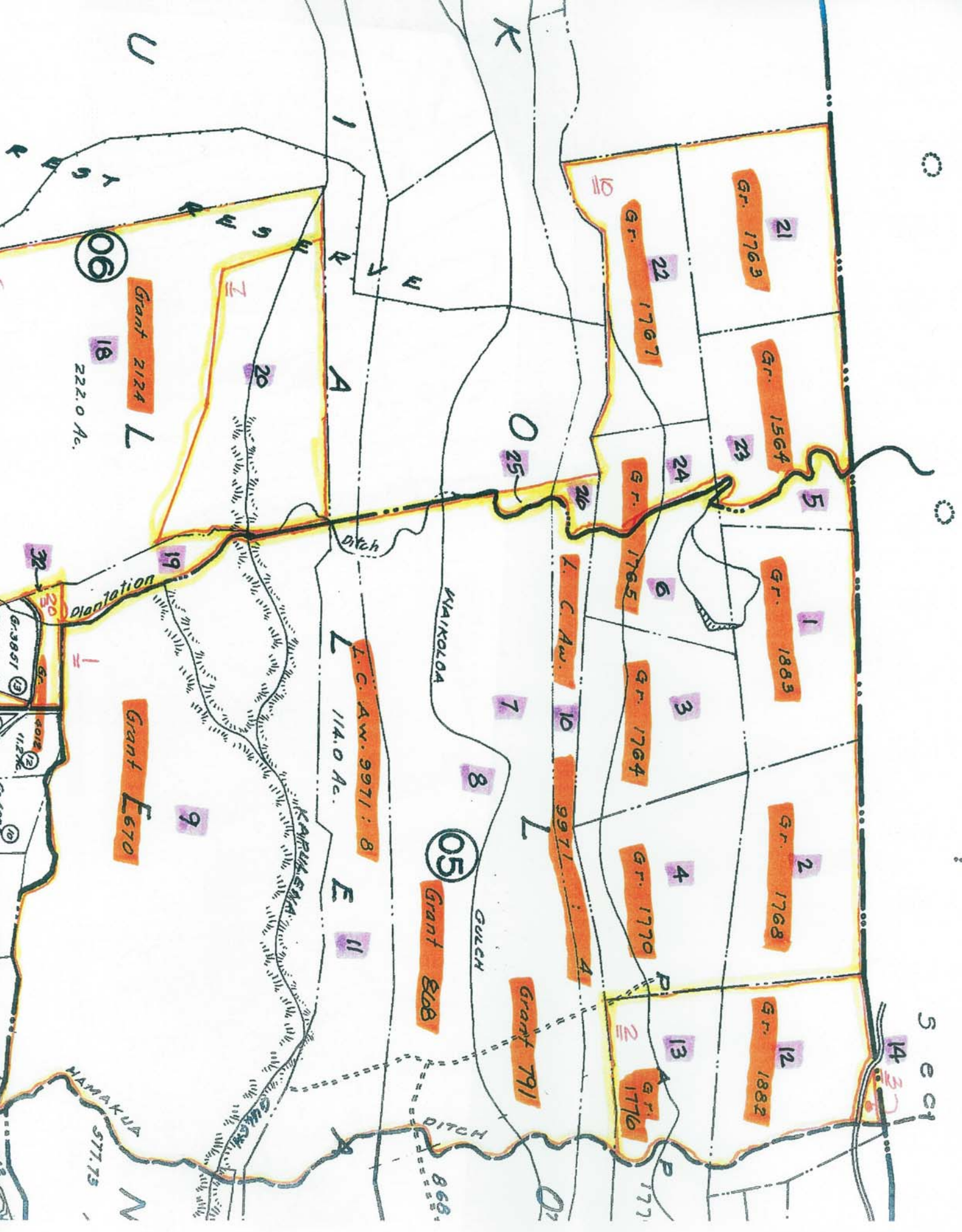


HAMAKUA STATE  
FOREST RESERVE









Appendix *B*

{ Flora and Fauna Study Assessment }

**FLORA AND FAUNA SURVEY AND ASSESSMENT  
KAPULENA ALLOTMENT, HAMAKUA, HAWAII COUNTY**

**INTRODUCTION**

The Kapulena Allotment consists of 10 parcels of land (TMKs (3) 4-7-05:1,2 & 3 and (3) 4-7-06:1,5,6,7,10,18 & 20) totaling 1,738.8 acres of old sugar cane land that is presently abandoned and overgrown (see figure 1). It lies on the lower northwest flank of Maunakea between Honokaa and Kukuhaele, above the Honokaa-Waipio Road and below the Hawaii Belt Road. This study was initiated by the County of Hawaii in support of a proposed land sale, in fulfillment of environmental requirements of the planning process.

**SITE DESCRIPTION**

The entire project area consists of moderately sloping lands with broad ridges and a few shallow gulches. The lower boundary is the Hamakua Ditch at 1,000 ft. elevation while the upper boundary is the mauka extent of the old cane fields which varies from 1,600 ft. up to 2,100 ft. elevation. The eastern boundary is Honokaa Gulch and the property extends through the ahupua'a of Malanahae, Kapoo'ula, Hauko'i, Ke'ahakea, Ka'auhuhu, Kapulena, Wai'ale'ale 1 & 2, Waikoloa, Niupuka and to the west boundary of Hanalei. The vegetation consists alternately of vast expanses of dense grasses and forests of fast-growing trees on the old cane lands and larger trees in the gulches. Soils are characterized as Mauna Kea Ash, deep, well drained soils developed from ash deposits from some of Mauna Kea's most recent eruptions 4,000 to 14,000 years ago (Wolfe & Morris, 1996). Annual rainfall averages 75 to 80 inches with the bulk falling during the winter and early spring (Armstrong, 1983).

**BIOLOGICAL HISTORY**

This windward slopes of Hamakua District at this elevation were once clothed with a dense forest of 'ohi'a (*Metrosideros polymorpha*), kopiko'ula (*Psychotria hawaiiensis*), kolea lau nui (*Myrsine lessertiana*) and neneleau (*Rhus sandwicensis*), and an equally dense understory of shrubs such as manono (*Kadua affinis*) and ferns such as uluhe (*Dicranopteris linearis*), palapalai (*Microlepia strigosa*) and three species of hapu'u (*Cibotium* spp.). A great variety of less common species of trees, shrubs, vines, herbs and ferns would have made for a diverse and rich forest.

The Hawaiians lived mostly at lower elevations where they farmed the larger, well-watered valley bottoms and gently sloping ridge tops or fished along the coast. They made forays into the higher forests for timber, medicines, fiber plants and bird feathers. Their activities had moderate effect on the lower elevation environment but the mauka forests would have been little changed.

In the 1800s grazing animals were introduced to this area and in the latter part of the century thousands of acres of forests were cleared for sugar cane agriculture and were plowed, burned and farmed for over a century. Sugar growing ended abruptly in the 1990s and these lands have been used for cattle grazing or stand idle. The majority of this area today is overgrown with either dense stands of 6 to 8 foot tall Guinea grass (*Panicum maximum*) or forests of common ironwood (*Casuarina equisetifolia*) that together occupy about 90% of the project area.

**FLORA AND FAUNA SURVEY AND ASSESSMENT**

for the

**KAPULENA ALLOTMENT**

**HAMAKUA, HAWAII ISLAND**

by

**ROBERT W. HOBBS**  
ENVIRONMENTAL CONSULTANT  
Kokomo, Maui  
October 2009

Prepared for:  
PBR Hawaii



The several gulches that dissect the property retain a few of the hardier native species that remain, but there is little of the former rich diversity of plants, mammals, birds, insects and snails that once occupied this area.

## SURVEY OBJECTIVES

This report summarizes the findings of a flora and fauna survey of the County of Hawaii, Kapulea Allotment lands which was conducted between September 28 and October 1, 2009. The objectives of the survey were to:

1. Document what plant, bird and mammal species occur on the property or may likely occur in the existing habitat.
2. Document the status and abundance of each species.
3. Determine the presence or likely occurrence of any native flora and fauna, particularly any that are Federally listed as Threatened or Endangered. If such occur, identify what features of the habitat may be essential for these species.
4. Determine if the project area contains any special habitats which if lost or altered might result in a significant negative impact on the flora and fauna in this part of the island.

## BOTANICAL SURVEY REPORT

### SURVEY METHODS

A walk-through botanical survey method was used following routes to ensure that all parts of this large property were covered. Areas most likely to harbor native or rare plants such as the numerous gulches that dissect the property were more intensively examined. These included Honokāia, Mālanahā, Kawaikālia, Kapulea, Waikōloa, Wa'ale'ale and Hanapa'i Gulches. Notes were made on plant species, distribution and abundance as well as on terrain and substrate.

### DESCRIPTION OF THE VEGETATION

The vegetation on the property is dominated by species that have grown-in on the abandoned sugar cane lands in the past 15 years. Two species in particular, Guinea grass and common ironwood, grow on 90% of the land and are rated as abundant. The Guinea grass grows in nearly impenetrable fields that are 6 to 8 feet deep, and it even fills the shallower gulches. The common ironwood, which has spread from seed blown by the trade winds from former windbreak trees near the coast, now forms dense, 30 – 50 foot tall stands across most of the property. Seven additional species were rated as common: (*Blechnum appendiculatum*) no common name, Asian sword fern (*Nephrolepis brownii*), rough maidenhair fern (*Adiantum hispidulum*), (*Christella parasitica*) no

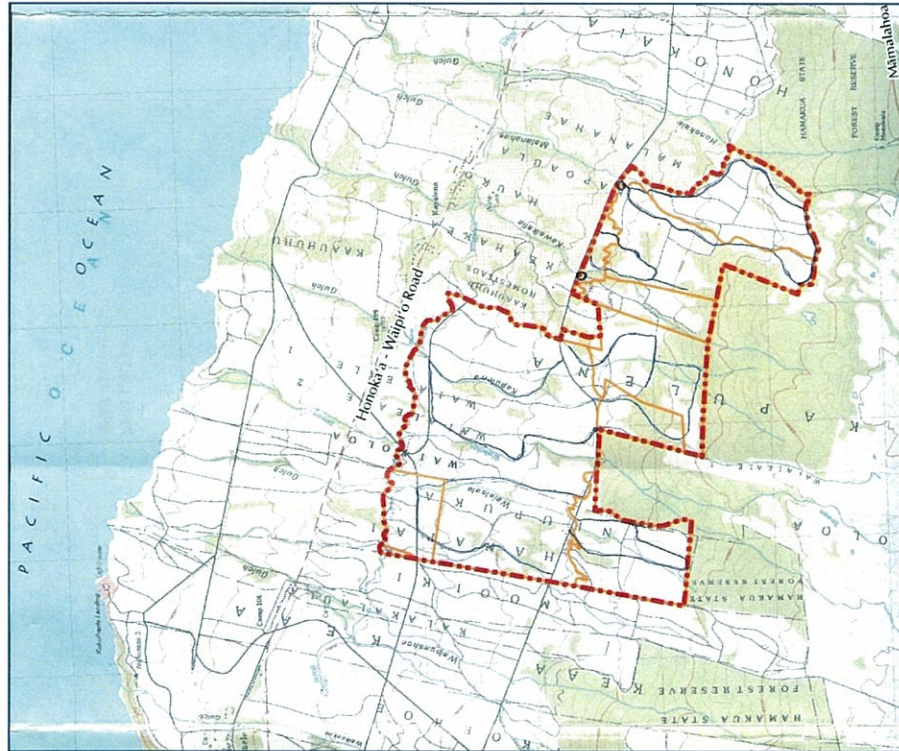


FIGURE 1 – Project Area



common name, molasses grass (*Melinis minutiflora*), 'ōhi'a (*Metrosideros polymorpha*) and strawberry guava (*Psidium cattleianum*). The ferns were found under the common ironwood and in the gulches. The molasses grass was found growing in the open with the Guinea grass. The 'ōhi'a and the strawberry guava were found primarily in the gulches and along the mauka fringe of the property.

A total of 161 plant species were recorded across the entire property during nine site visits. Of these 21 were native species including 9 that are endemic to Hawaii: kilau fern (*Pteridium aquilinum* var. *decompositum*), hapu'u pulu (*Cibotium glaucum*), ni'ani'au (*Nephrolepis exaltata* subsp. *hawaiensis*), lepelepeamoa (*Selaginella arbuscula*), neneleau, kolea lau nui, 'ōhi'a, manono and kōpiko'ula (*Psychotria hawaiiensis*), and 12 species that are indigenous in Hawaii and well as elsewhere in the Pacific including: palapalai fern, uluhe, (*Gonocarpus minutus*), no common name, pala'ā fern (*Sphenomeris chinensis*), wawae'iole (*Lycopodiella cernua*), pākahakaha (*Lepisorus thunbergianus*), moa (*Psilotum nudum*), (*Cyperus polystachyos*) no common name, koali awahia (*Ipomoea indica*), huehue (*Coccoloba orbiculatus*), 'ala' alawainui (*Peperomia blanda* var. *floribunda*) and popolo (*Solanum americanum*). None of these native species are rare and none of them are federally listed or protected. The remaining 135 plant species were all non-native in Hawaii and of no special conservation interest or concern. Two fig species, rough-leaved fig (*Ficus nota*) and rock fig (*Ficus platypoda*), had been planted by the plantation in some of the gulches, most notably in Kawaikalia and Honokāia Gulches.

The whole property showed signs of pig rooting. This was especially true in the gulches where every square foot appeared to be heavily rooted. This rooting had the twin effects of severely limiting the diversity of the more delicate native understory species, while at the same time aiding the spread of aggressive, shade-tolerant weeds such as strawberry guava.

## DISCUSSION AND RECOMMENDATIONS

The vegetation throughout the project area consists primarily of non-native species. The property has been heavily altered by historic land uses and continues to be degraded by invasive alien plant species and feral pigs. The many gulches dissecting the property harbor the great majority of the 21 remaining species of native plants, but most of these are older, mature plants. Reproduction of all but a few native species is almost non-existent.

No federally listed Threatened or Endangered plant species (USFWS, 2009) were found on the property nor were any found that are candidates for such status. No special habitats were found on the property either.

Because of the above existing conditions and because the proposed action does not involve any land use changes, there is little of botanical concern regarding this property. The proposed action is not expected to have a significant negative impact on the botanical resources in this part of the Big Island.

No recommendations are offered at this time regarding the botanical resources.



Figure 2 Dense grassland – 6 to 8 ft. deep Guinea grass



Figure 3 Ironwood forest with Guinea grass understory

## PLANT SPECIES LIST

Following is a checklist of all those vascular plant species inventoried during the field studies. Plant families are arranged alphabetically within three groups: Ferns, Monocots and Dicots. Taxonomy and nomenclature of the Ferns follow Palmer (2003), while the Monocots and Dicots follow Wagner et al. (1999) and Staples and Herbst (2005).

For each species, the following information is provided:

1. Scientific name with author citation
2. Common English or Hawaiian name.
3. Bio-geographical status. The following symbols are used:
  - endemic = native only to the Hawaiian Islands; not naturally occurring anywhere else in the world.
  - indigenous = native to the Hawaiian Islands and also to one or more other geographic areas(s).
  - Polynesian = those plants brought to the islands by the Polynesians in the course of their migrations.
  - non-native = all those plants brought to the islands intentionally or accidentally after western contact.
4. Abundance of each species within the project area:
  - abundant = forming a major part of the vegetation within the project area.
  - common = widely scattered throughout the area or locally abundant within a portion of it.
  - uncommon = scattered sparsely throughout the area or occurring in a few small patches.
  - rare = only a few isolated individuals within the project area.

| SCIENTIFIC NAME  | COMMON NAME         | STATUS     | ABUNDANCE |
|--|---------------------|------------|-----------|
| <b>FERNS</b>   |                     |            |           |
| <b>ATHYRIACEAE (Lady Fern Family)</b>  |                     |            |           |
| <i>Deparia petersenii</i> (Kunze) Kato   | -----               | non-native | uncommon  |
| <b>BLECHNACEAE (Chain Fern Family)</b>   |                     |            |           |
| <i>Blechnum appendiculatum</i> Willd.  | -----               | non-native | common    |
| <b>CYATHEACEAE (Tree Fern Family)</b>  |                     |            |           |
| <i>Sphaeropteris cooperi</i> (Hooker) R.M. Tryon                                 | Australia tree fern | non-native | rare      |
| <b>DENNSTAEDTIACEAE (Bracken Family)</b>   |                     |            |           |
| <i>Microlepia strigosa</i> (Thunb.) C. Presl                                     | <i>palapalai</i>    | indigenous | uncommon  |
| <i>Pteridium aquilinum</i> (L.) Kuhn var. <i>decompositum</i> (Gaud.) R.M. Tryon | <i>kilau</i>        | endemic    | rare      |
| <b>DICKSONIACEAE (Dicksonia Fern Family)</b>                                     |                     |            |           |
| <i>Cibotium glaucum</i> (Sm.) Hook. & Arnott                                     | <i>hapu'u puku</i>  | endemic    | uncommon  |
| <b>DRYOPTERIDACEAE (Wood Fern Family)</b>  |                     |            |           |
| <i>Tectaria incisa</i> Cav.  | -----               | non-native | rare      |
| <b>GLEICHENIACEAE (False Staghorn Fern Family)</b>                               |                     |            |           |
| <i>Dicranopteris linearis</i> (Burm.f.) Underw.                                  | <i>uluhe</i>        | indigenous | uncommon  |
| <b>HYMENOPHYLLACEAE (Filmy Fern Family)</b>                                      |                     |            |           |
| <i>Gonocormus minutus</i> (Blume) Bosch  | -----               | indigenous | rare      |
| <b>LINDSAEACEAE (Lindsaea Fern Family)</b>                                       |                     |            |           |
| <i>Lindsaea ensifolia</i> Sw.  | -----               | non-native | rare      |
| <i>Sphenomeris chinensis</i> (L.) Maxon  | <i>pala'i</i>       | indigenous | rare      |
| <b>LYCOPODIACEAE (Club Moss Family)</b>  |                     |            |           |
| <i>Lycopodiella cernua</i> (L.) Pic. Serm.                                       | <i>wawae 'ole</i>   | indigenous | rare      |
| <b>NEPHROLEPIDACEAE (Sword Fern Family)</b>                                      |                     |            |           |
| <i>Nephrolepis brownii</i> (Desv.) Hovenkamp & Miyam.                            | Asian sword fern    | non-native | common    |



| SCIENTIFIC NAME                                  | COMMON NAME                  | STATUS     | ABUNDANCE |
|--|------------------------------|------------|-----------|
| <i>Condyline fruticosa</i> (L.) A. Chev.         | ki, ti leaf                  | Polynesian | uncommon  |
| COMMELINACEAE (Spiderwort Family)                |                              |            |           |
| <i>Commelina diffusa</i> N.L. Burm.              | honohono                     | non-native | uncommon  |
| CYPERACEAE (Sedge Family)                        |                              |            |           |
| <i>Cyperus polystachyos</i> Rottb.               | -----                        | indigenous | uncommon  |
| <i>Cyperus rotundus</i> L.                       | nut sedge                    | non-native | rare      |
| <i>Kyllingia brevifolia</i> Rottb.               | kili'o'opu                   | non-native | rare      |
| JUNCACEAE (Rush Family)                          |                              |            |           |
| <i>Juncus bufonius</i> L.                        | toad rush                    | non-native | rare      |
| LILIACEAE (Lily Family)                          |                              |            |           |
| <i>Hymenocallis pedalis</i> Herbert              | spider lily                  | non-native | rare      |
| MUSACEAE (Banana Family)                         |                              |            |           |
| <i>Musa acuminata x balbisiana</i> Colla         | banana                       | non-native | rare      |
| ORCHIDACEAE (Orchid Family)                      |                              |            |           |
| <i>Arundina graminifolia</i> (D.Don) Hochreutner | bamboo orchid                | non-native | uncommon  |
| POACEAE (Grass Family)                           |                              |            |           |
| <i>Andropogon virginicus</i> L.                  | broomsedge                   | non-native | uncommon  |
| <i>Axonopus compressus</i> (Sw.) P. Beauv.       | broad-leaved<br>carpetgrass  | non-native | rare      |
| <i>Axonopus fissifolius</i> (Raddi) Kuhl.        | narrow-leaved<br>carpetgrass | non-native | uncommon  |
| <i>Briza</i> sp.                                 | quaking grass                | non-native | rare      |
| <i>Chloris radiata</i> (L.) Sw.                  | plushgrass                   | non-native | rare      |
| <i>Digitaria violascens</i> Link                 | smooth crabgrass             | non-native | rare      |
| <i>Elesine indica</i> (L.) Gaertn.               | wiregrass                    | non-native | rare      |
| <i>Eragrostis pectinacea</i> (Michx.) Nees       | Carolina lovegrass           | non-native | rare      |
| <i>Melinis minutiflora</i> P. Beauv.             | molasses grass               | non-native | common    |

| SCIENTIFIC NAME   | COMMON NAME                  | STATUS     | ABUNDANCE |
|---|------------------------------|------------|-----------|
| <i>Nephrolepis exaltata</i> (L.) Schott subsp. <i>hawaiiensis</i> W.H. Wagner | ni'ani'au                    | endemic    | uncommon  |
| POLYPODIACEAE (Polypody Fern Family)  |                              |            |           |
| <i>Lepisorus thunbergianus</i> (Kaulf.) Ching                                 | pākahakaha                   | indigenous | rare      |
| <i>Phlebodium aureum</i> (L.) J. Sm.  | rabbit's-foot fern           | non-native | uncommon  |
| PSILOTACEAE (Whisk Fern Family)   |                              |            |           |
| <i>Psilotum nudum</i> (L.) P. Beauv.  | moa                          | indigenous | rare      |
| PTERIDACEAE (Brake Fern Family)   |                              |            |           |
| <i>Adiantum hispidulum</i> Sw.  | rough maidenhair fern        | non-native | common    |
| <i>Adiantum raddianum</i> C. Presl  | maidenhair fern              | non-native | rare      |
| <i>Pityrogramma austroamericana</i> Domin                                     | gold fern                    | non-native | rare      |
| <i>Pityrogramma x mckenneyi</i> W.H. Wagner                                   | hybrid gold fern             | non-native | rare      |
| SELAGINELLACEAE (Spike Moss Family)   |                              |            |           |
| <i>Selaginella arbuscula</i> Brack.   | lepelepe a moa               | endemic    | rare      |
| <i>Selaginella kraussiana</i> (Kunze) A. Braun                                | spreading selaginella        | non-native | rare      |
| THELYPTERIDACEAE (Marsh Fern Family)  |                              |            |           |
| <i>Christella dentata</i> (Forssk.) Brownsey & Jermy                          | -----                        | non-native | rare      |
| <i>Christella parasitica</i> (L.) H. Lev.                                     | -----                        | non-native | common    |
| <i>Macrothelypteris torresiana</i> (Gaud.) Ching                              | -----                        | non-native | rare      |
| MONOCOTS  |                              |            |           |
| ARACEAE (Aroid Family)  |                              |            |           |
| <i>Philodendron scandens</i> K. Kotch & Sello                                 | heart-leaved<br>philodendron | non-native | rare      |
| <i>Xanthosoma robustum</i> Schott   | 'ape                         | non-native | rare      |
| ASPARAGACEAE (Asparagus Family)   |                              |            |           |

| SCIENTIFIC NAME  | COMMON NAME             | STATUS     | ABUNDANCE |
|--|-------------------------|------------|-----------|
| <i>Schinus terebinthifolius</i> Raddi                  | Christmas berry         | non-native | uncommon  |
| APIACEAE (Parsley Family)                              |                         |            |           |
| <i>Centella asiatica</i> (L.) Urb.                     | Asiatic pennywort       | non-native | rare      |
| ARALIACEAE (Ginseng Family)                            |                         |            |           |
| <i>Hydrocotyle sibthorpioides</i> Lam.                 | marsh pennywort         | non-native | rare      |
| ASTERACEAE (Sunflower Family)                          |                         |            |           |
| <i>Agerathia riparia</i> (Regel) R. King & H. Robinson | <i>Hāmākua pamakani</i> | non-native | rare      |
| <i>Ageratum conyzoides</i> L.                          | <i>maile hohono</i>     | non-native | rare      |
| <i>Ageratum houstonianum</i> Mill.                     | <i>maile hohono</i>     | non-native | rare      |
| <i>Bidens pilosa</i> L.                                | Spanish needle          | non-native | rare      |
| <i>Conyza bonariensis</i> (L.) Cronq.                  | hairy horseweed         | non-native | rare      |
| <i>Conyza canadensis</i> (L.) Cronq.                   | horseweed               | non-native | rare      |
| <i>Crassocephalum crepidioides</i> (Benth.) S. Moore   | redflower ragleaf       | non-native | rare      |
| <i>Erechtites valerianifolia</i> (Wolf) D.C.           | fireweed                | non-native | rare      |
| <i>Hypochoeris radicata</i> L.                         | gosmore                 | non-native | rare      |
| <i>Montanoa hibiscifolia</i> Benth.                    | Christmas daisy         | non-native | rare      |
| <i>Pluchea carolinensis</i> (Jacq.) G. Don             | sourbush                | non-native | rare      |
| <i>Senecio madagascariensis</i> Poir.                  | fireweed                | non-native | uncommon  |
| <i>Sphagneticola trilobata</i> (L.) Pruski             | wedelia                 | non-native | rare      |
| <i>Tithonia diversifolia</i> (Hemsl.) A Gray           | tree marigold           | non-native | rare      |
| BEGONIACEAE (Begonia Family)                           |                         |            |           |
| <i>Begonia hirtella</i> Link                           | -----                   | non-native | rare      |
| BIGNONIACEAE (Bignonia Family)                         |                         |            |           |
| <i>Spathodea campanulata</i> P. Beauv                  | African tulip tree      | non-native | rare      |
| BOMBACACEAE (Bombax Family)                            |                         |            |           |

| SCIENTIFIC NAME                                      | COMMON NAME      | STATUS     | ABUNDANCE |
|--|------------------|------------|-----------|
| <i>Melinis repens</i> (Willd.) Zizka                 | Natal redbop     | non-native | rare      |
| <i>Opismenus hirtellus</i> (L.) P. Beauv.            | basketgrass      | non-native | uncommon  |
| <i>Panicum maximum</i> Jacq.                         | Guinea grass     | non-native | abundant  |
| <i>Paspalum conjugatum</i> Bergius                   | Hilo grass       | non-native | uncommon  |
| <i>Paspalum urvillei</i> Steud.                      | Vasey grass      | non-native | rare      |
| <i>Pennisetum clandestinum</i> Chiov.                | Kikuyu grass     | non-native | rare      |
| <i>Pennisetum purpureum</i> Schumach.                | Napier grass     | non-native | uncommon  |
| <i>Saccharum officinarum</i> L.                      | sugar cane       | Polynesian | rare      |
| <i>Saccolalepis indica</i> (L.) Chase                | Glenwood grass   | non-native | uncommon  |
| <i>Schizachyrium condensatum</i> (Kunth) Nees        | -----            | non-native | uncommon  |
| <i>Setaria parviflora</i> (Poir.) Kerguelen          | yellow foxtail   | non-native | rare      |
| <i>Sporobolus africanus</i> (Poir.) Robyns & Tournay | smutgrass        | non-native | rare      |
| <i>Sporobolus diander</i> (Retz.) P. Beauv.          | Indian dropseed  | non-native | rare      |
| <i>Urochloa mutica</i> (Forssk.) T.Q. Nguyen         | California grass | non-native | rare      |
| ZINGIBERACEAE (Ginger Family)                        |                  |            |           |
| <i>Hedychium cornutum</i> J. König                   | white ginger     | non-native | rare      |
| <i>Hedychium flavescens</i> N. Carey ex Roscoe       | yellow ginger    | non-native | rare      |
| <i>Hedychium gardnerianum</i> Shepherd ex Ker-Gawl.  | kahili ginger    | non-native | rare      |
| <i>Zingiber zerumbet</i> (L.) Sm.                    | 'awapuhi         | Polynesian | uncommon  |
| DICOTS   |                  |            |           |
| ACANTHACEAE (Acanthus Family)                        |                  |            |           |
| <i>Asystasia</i> sp.                                 | -----            | non-native | rare      |
| ANACARDIACEAE (Mango Family)                         |                  |            |           |
| <i>Rhus sandwicensis</i> A. Gray                     | <i>neneleau</i>  | endemic    | uncommon  |

| SCIENTIFIC NAME                             | COMMON NAME               | STATUS     | ABUNDANCE |
|---|---------------------------|------------|-----------|
| <i>Desmodium intortum</i> (Mill.) Urb.      | -----                     | non-native | rare      |
| <i>Desmodium sandwicense</i> E. Mey.        | Spanish clover            | non-native | rare      |
| <i>Desmodium triflorum</i> (L.) DC          | three-flowered beggarweed | non-native | rare      |
| <i>Indigofera suffruticosa</i> Mill.        | <i>inikō</i>              | non-native | rare      |
| <i>Macropitium lathyroides</i> (L.) Urb.    | wild bean                 | non-native | rare      |
| <i>Mimosa pudica</i> L.                     | <i>hilihila</i>           | non-native | rare      |
| <i>Trifolium repens</i> L.                  | white clover              | non-native | rare      |
| HYPERICACEAE (St. Johnswort Family)         | -----                     | non-native | rare      |
| <i>Hypericum mutilum</i> L.                 | -----                     | non-native | rare      |
| LAMIACEAE (Mint Family)                     | comb hyptis               | non-native | rare      |
| <i>Hyptis pectinata</i> (L.) Poit.          | -----                     | non-native | rare      |
| LAURACEAE (Laurel Family)                   | avocado                   | non-native | rare      |
| <i>Persea americana</i> Mill.               | -----                     | non-native | rare      |
| LYTHRACEAE (Loosestrife Family)             | tarweed                   | non-native | rare      |
| <i>Cuphea carthagenensis</i> (Jacq.) Macbr. | -----                     | non-native | rare      |
| MALVACEAE (Mallow Family)                   | -----                     | non-native | rare      |
| <i>Sida acuta</i> N.L. Burm.                | -----                     | non-native | rare      |
| <i>Sida rhombifolia</i> L.                  | Cuban jute                | non-native | rare      |
| MELASTOMATACEAE (Melastoma Family)          | -----                     | non-native | rare      |
| <i>Clidemia hirta</i> (L.) D. Don           | Koster's curse            | non-native | rare      |
| <i>Tibouchina herbacea</i> (DC.) Cogn.      | cane tibouchina           | non-native | rare      |
| MELIACEAE (Mahogany Family)                 | -----                     | non-native | rare      |
| <i>Toona ciliata</i> M. Roem.               | Australian red cedar      | non-native | rare      |
| MENISPERMACEAE (Moonseed Family)            | -----                     | non-native | rare      |

| SCIENTIFIC NAME  | COMMON NAME         | STATUS     | ABUNDANCE |
|--|---------------------|------------|-----------|
| <i>Pachira aquatica</i> Aublet                         | Guiana chestnut     | non-native | rare      |
| BRASSICACEAE (Mustard Family)                          | -----               | non-native | rare      |
| <i>Rorippa sarmentosa</i> (G. Forst.) J. F. Macbr.     | <i>pā'ihī</i>       | non-native | rare      |
| CARYOPHYLLACEAE (Pink Family)                          | -----               | non-native | rare      |
| <i>Drymaria cordata</i> (L.) Willd. ex Roem. & Schult. | <i>pipili</i>       | non-native | rare      |
| CASUARINACEAE (She-oak Family)                         | common ironwood     | non-native | abundant  |
| <i>Casuarina equisetifolia</i> L.                      | -----               | non-native | abundant  |
| COMBRETACEAE (Indian Almond Family)                    | -----               | non-native | abundant  |
| <i>Terminalia myriocarpa</i> Van Heurk & Mull. Arg.    | <i>jhalha</i>       | non-native | rare      |
| CONVOLVULACEAE (Morning Glory Family)                  | -----               | indigenous | rare      |
| <i>Ipomoea indica</i> (J. Burm.) Merr.                 | <i>kooli awahia</i> | indigenous | rare      |
| CRASSULACEAE (Stonecrop Family)                        | -----               | non-native | rare      |
| <i>Bryophyllum pinnatum</i> (Lam.) Oken                | air plant           | non-native | rare      |
| EUPHORBIACEAE (Spurge Family)                          | -----               | Polynesian | uncommon  |
| <i>Aleurites moluccana</i> (L.) Willd.                 | kukui               | Polynesian | uncommon  |
| <i>Chamaesyce hirta</i> (L.) Millsp.                   | hairy spurge        | non-native | rare      |
| <i>Chamaesyce thymifolia</i> (L.) Millsp.              | -----               | non-native | rare      |
| <i>Ricinus communis</i> L.                             | Castor bean         | non-native | rare      |
| FABACEAE (Pea Family)                                  | -----               | non-native | rare      |
| <i>Acacia</i> sp.                                      | -----               | non-native | rare      |
| <i>Canavalia cathartica</i> Thouars                    | maunaloa            | non-native | rare      |
| <i>Chamaecrista nictitans</i> (L.) Moench              | partridge pea       | non-native | rare      |
| <i>Crotalaria brevidens</i> Benth.                     | rattlepod           | non-native | rare      |
| <i>Crotalaria micans</i> Link                          | rattlepod           | non-native | uncommon  |
| <i>Crotalaria pallida</i> Aiton                        | smooth rattlepod    | non-native | rare      |
| <i>Desmodium incanum</i> DC                            | ka'imi clover       | non-native | rare      |



| SCIENTIFIC NAME                                | COMMON NAME                 | STATUS     | ABUNDANCE |
|--|-----------------------------|------------|-----------|
| <i>Coccoltus orbiculatus</i> (L.) DC.          | huehue                      | indigenous | rare      |
| MORACEAE (Mulberry Family)                     |                             |            |           |
| <i>Ficus nota</i> (Blanco) Merrill             | rough-leaved fig            | non-native | uncommon  |
| <i>Ficus platypoda</i> (Miguel) Miguel         | rock fig                    | non-native | rare      |
| MYRSINACEAE (Myrsine Family)                   |                             |            |           |
| <i>Ardisia crenata</i> Sims                    | Hilo holly                  | non-native | rare      |
| Myrsine lessertiana A. DC.                     | <i>kālea lau nui</i>        | endemic    | rare      |
| MYRTACEAE (Myrtle Family)                      |                             |            |           |
| <i>Eucalyptus botryoides</i> Sm.               | bangalay                    | non-native | rare      |
| <i>Eucalyptus robusta</i> Sm.                  | swamp mahogany              | non-native | rare      |
| <i>Metrosideros polymorpha</i> Gaud.           | <i>ōhi'a</i>                | endemic    | common    |
| <i>Psidium cattleianum</i> Sabine              | strawberry guava            | non-native | common    |
| <i>Psidium gnajava</i> L.                      | guava                       | non-native | uncommon  |
| <i>Syzygium jambos</i> (L.) Alston             | rose apple                  | non-native | rare      |
| OLEACEAE (Olive Family)                        |                             |            |           |
| <i>Fraxinus uhdei</i> (Wenzig) Lingelsh.       | tropical ash                | non-native | rare      |
| ONAGRACEAE (Evening Primrose Family)           |                             |            |           |
| <i>Ludwigia palustris</i> (L.) Elliot          | marsh purslane              | non-native | rare      |
| OROBANCHACEAE (Broom-rape Family)              |                             |            |           |
| <i>Castilleja arvensis</i> Cham. & Schlectend. | Indian paintbrush           | non-native | rare      |
| OXALIDACEAE (Wood Sorrel Family)               |                             |            |           |
| <i>Oxalis corniculata</i> L.                   | 'ihi'ai, yellow wood sorrel | Polynesian | rare      |
| <i>Oxalis debilis</i> Kunth                    | pink wood sorrel            | non-native | rare      |
| PASSIFLORACEAE (Passion Flower Family)         |                             |            |           |

| SCIENTIFIC NAME  | COMMON NAME            | STATUS     | ABUNDANCE |
|--|------------------------|------------|-----------|
| <i>Passiflora edulis</i> Sims  | passion fruit          | non-native | rare      |
| PIPERACEAE (Pepper Family)   |                        |            |           |
| <i>Peperomia blanda</i> (Jacq.) Kunth var. <i>floribunda</i> (Miq.) H. Huber | 'ula alawainui         | indigenous | rare      |
| PLANTAGINACEAE (Plantain Family)   |                        |            |           |
| <i>Lidemia crustacea</i> (L.) F.V. Mueller                                   | false pimpernel        | non-native | rare      |
| <i>Plantago lanceolata</i> L.  | narrow-leaved plantain | non-native | rare      |
| <i>Plantago major</i> L.   | <i>laukahi</i>         | non-native | rare      |
| <i>Torenia asiatica</i> L.   | <i>Ola'a beauty</i>    | non-native | rare      |
| <i>Veronica serpyllifolia</i> L.   | thyme-leaved speedwell | non-native | rare      |
| POLYGALACEAE (Milkwort Family)   |                        |            |           |
| <i>Polygala paniculata</i> L.  | milkwort               | non-native | rare      |
| POLYGONACEAE (Buckwheat Family)  |                        |            |           |
| <i>Persicaria glabra</i> (Willd.) M. Gomez                                   | <i>kāmole</i>          | non-native | rare      |
| PROTEACEAE (Protea Family)   |                        |            |           |
| <i>Grevillea robusta</i> A. Cunn. ex R. Br.                                  | silk oak               | non-native | rare      |
| <i>Macadamia integrifolia</i> Maiden & Betche                                | macadamia nut          | non-native | rare      |
| ROSACEAE (Rose Family)   |                        |            |           |
| <i>Eriobotrya japonica</i> (Thunb.) Lindl.                                   | loquat                 | non-native | rare      |
| <i>Rubus rosifolius</i> Sm.  | thimbleberry           | non-native | rare      |
| RUBIACEAE (Coffee Family)  |                        |            |           |
| <i>Coffea arabica</i> L.   | Arabian coffee         | non-native | rare      |
| <i>Kadua affinis</i> DC.   | manono                 | endemic    | rare      |
| <i>Oldenlandia corymbosa</i> L.  | -----                  | non-native | rare      |
| <i>Psychotria hawaiiensis</i> (A. Gray) Fosb.                                | <i>kōpiko 'ula</i>     | endemic    | rare      |
| <i>Spermacoce assurgens</i> Ruiz & Pav.                                      | buttonweed             | non-native | rare      |

| SCIENTIFIC NAME                          | COMMON NAME       | STATUS     | ABUNDANCE |
|--|-------------------|------------|-----------|
| <i>Spermacoce</i> sp.                    | -----             | non-native | rare      |
| SAPOTACEAE (Sapodilla Family)            |                   |            |           |
| <i>Chrysophyllum mexicanum</i> Brandegee | Mexican satinleaf | non-native | rare      |
| SCROPHULARIACEAE (Figwort Family)        |                   |            |           |
| <i>Buddleia asiatica</i> Lour.           | dog tail          | non-native | rare      |
| SOLANACEAE (Nightshade Family)           |                   |            |           |
| <i>Physalis peruviana</i> L.             | <i>pohā</i>       | non-native | rare      |
| <i>Solanum americanum</i> Mill.          | pōpolo            | indigenous | rare      |
| <i>Solanum capsicoides</i> All.          | kikania lei       | non-native | rare      |
| STERCULIACEAE (Cacao Family)             | -----             |            |           |
| <i>Melochia umbellata</i> (Houtt.) Stapf |                   | non-native | rare      |
| VERBENACEAE (Verbena Family)             |                   |            |           |
| <i>Stachytarpheta australis</i> Moldenke | <i>ōwī</i>        | non-native | rare      |

## FAUNA SURVEY REPORT

### SURVEY METHODS

A walk-through fauna survey method was conducted in conjunction with the botanical survey. All parts of the project area including all habitat types were covered. Field observations were made with the aid of binoculars and by listening to vocalizations. Notes were made on species, abundance, activities and location as well as observations of trails, tracks, scat and signs of feeding. In addition four evening visits were made to the area to record crepuscular activities and vocalizations and to see if there was any evidence of occurrence of the Hawaiian hoary bat (*Lasiurus cinereus semotus*) in the area.

### RESULTS

#### MAMMALS

Only sign of three mammal species were observed during nine site visits to the property. Taxonomy and nomenclature follow Tomich (1986).

Feral pig (*Sus Scrofa*) – Pig sign was everywhere on the property. Pigs were seen and heard on numerous occasions.

Mongoose (*Herpestes auropunctatus*) – A few mongoose were seen in the margins of the forest openings where they hunt for rodents and birds.

Hawaiian hoary bat, 'ōpe'ape'a (*Lasiurus cinereus semotus*) – A single bat was sighted at about 1,600 feet elevation on one evening survey near the rock quarry.

While not seen during the survey rats (*Rattus spp.*) and mice (*Mus domesticus*) would be common in this type of area where they would feed on seeds, fruits and herbaceous vegetation. Feral cats (*Felis catus*) would also be expected here. They would hunt for the rodents and birds.

A special effort was made to look for any occurrence of the native Hawaiian hoary bat by making four evening surveys on the property. When present in an area these bats can be easily identified as they forage for insects, their distinctive flight patterns clearly visible in the glow of twilight. One bat was seen in this manner in one area around the rock quarry. In addition a bat detection device (Barbox IHD) was employed set to the frequency of 27,000 to 28,000 hertz which is typical for this bat species. The bat mentioned above was also detected at the same time using this device.



## BIRDS

Birdlife was fairly sparse in both diversity and numbers due to extensive Guinea grass and ironwood forest habitat. Only ten species of birds were seen during nine site visits. Taxonomy and nomenclature follow American Ornithologists' Union (2005).

Zebra dove (*Geopelia striata*) – These small doves were seen throughout the corridor feeding in small flocks in clearings and flying between trees.

Japanese white-eye (*Zosterops japonicus*) – Small groups of these small green birds were seen and heard twittering in trees throughout the property.

Chestnut mannikin (*Lophura Malacca*) – Flocks of these small reddish-brown birds were seen feeding on grass seeds.

Nutmeg mannikin (*Lophura punctulata*) – Small flocks of these mannikins were seen feeding on grass seeds, often in the company of chestnut mannikins.

Spotted dove (*Streptopelia chinensis*) – Several of these large doves were seen perched in trees and flying over the property.

House finch (*Carpodacus mexicanus*) – Small groups of these finches were found on this property where they associate with and feed on the seeds of common ironwood.

Northern cardinal (*Cardinalis cardinalis*) – A few cardinals were seen and heard calling from trees during both the day and evening surveys.

Red-billed leiothrix (*Leiothrix lutea*) – A few of these small colorful birds were seen and heard calling in forest trees mostly in the gulches.

Hwamei (*Garrulax canorus*) – A couple of these beautiful singers were heard warbling in gulch forests.

Kali pheasant (*Lophura leucomelanos*) – These dark pheasants were heard calling in the forests and a few feathers were found.

Had the survey been extended, no doubt other non-native birds would have been seen but the habitat is not suitable for Hawaii's native forest birds which occupy forested uplands beyond the elevational range of mosquitoes and the avian diseases they carry.

Two native birds, the endemic, endangered 'io or Hawaiian hawk (*Buteo solitarius*) and the endemic pueo or Hawaiian owl (*Asio flammeus sanwicensis*), are known to frequent wet windward forests where they prey on rodents and small birds. These two birds were looked for but were not seen during the survey.

No native seabirds, most particularly the Endangered petrel (*Pterodroma sanwicensis*) or the Threatened Newell's shearwater (*Puffinus auricularis newelli*) were found on the property nor were any burrows seen.

No Endangered nene or Hawaiian goose (*Branta sandvicensis*) were seen on the property. The habitat of dense forests and deep grasses is not suitable for these birds. They prefer lush green grass such as is found in irrigated lawns and golf courses or open lava shrublands.

## INSECTS

While insects in general were not tallied, a good diversity of types were seen that no doubt helped fuel the diversity of birdlife seen. One native Spingid moth, Blackburn's sphinx moth (*Manduca blackburni*) has been put on the Federal Endangered species list and this designation requires special focus (USFWS 2000). Blackburn's sphinx moth is known to occur in parts of West Hawaii and its feeding requirements are very specialized. It requires host plants in the nighthshade family that are toxic, such as native species of 'aiea (*Nothocestrum spp.*) and such non-native alternative hosts as tobacco (*Nicotiana tabacum*) and tree tobacco (*Nicotiana glauca*). None of these host species were found on the subject property and no Blackburn's sphinx moths or their larvae were seen.

Three Big Island endemic picture-wing flies have been listed as Endangered, (*Drosophila heteroneura*), (*D. mulif*) and (*D. ochrobasis*). These are known from various locations on the island between elevations of 3,000 and 5,500 feet. None of their host plants occur within the project area and none of these species were observed.

## DISCUSSION AND RECOMMENDATIONS

The fauna of the property were low in both numbers and diversity due to the condition of the habitat. The dense Guinea grass and common ironwood vegetation offers little that would attract most mammal and bird species. With the exception of the Hawaiian hoary bat, all mammal and birds species were non-native, and only the feral pig appears to be common to abundant throughout.

Feral pigs are able to burrow through the dense vegetation to access all part of the property. They spend most of their time in the gulches, however, where they intensively plow up the terrain in search of edible roots and earthworms. Hunters actively pursue these pigs and many are taken but the dense vegetation makes it difficult for the hunters to be effective at controlling the population at moderate levels.

While only one bat was seen during four evening surveys, these bats are known to be widespread on the Big Island and not uncommon in some area. They are also highly mobile, moving up and down mountain slopes and from one district to another. These movements are no doubt linked to food source availability. It is likely that more bats would be detected at another time on this property. While consideration for these endangered bats and their habitat is required, the proposed action associated with this property involves no changes in land use and there will be no impacts on the habitat. No recommendations regarding the Hawaiian hoary bat are suggested.

The Hawaiian hawk and the pueo were not detected during the survey but are known from this part of the Big Island. The hawk in particular is Endangered and carries this status and associated federal protections with it wherever it goes. It would be expected to occasionally visit this property and should be watched for. No impacts on this species, however, are expected to result from this project action.

In conclusion there is little that is unique about the degraded habitat on this property that would make it more special or important for native animal or bird species. Moreover, no immediate changes in land uses will result from this transaction. The proposed sale of the 1,738 acres of former sugar cane lands in the Kapulena Allotment is not expected to have a significant negative impact on the fauna resources in this part of Hāmākua District.

#### ANIMAL SPECIES LIST

Following is a checklist of the animal species inventoried during the field work. Animal species are arranged in descending abundance within two groups: Mammals and Birds. For each species the following information is provided:

1. Common name
2. Scientific name
3. Bio-geographical status. The following symbols are used:
  - endemic = native only to Hawaii; not naturally occurring anywhere else in the world.
  - indigenous = native to the Hawaiian Islands and also to one or more other geographic area(s).
  - non-native = all those animals brought to Hawaii intentionally or accidentally after western contact.
  - migratory = spending a portion of the year in Hawaii and a portion elsewhere. In Hawaii the migratory birds are usually in the overwintering/non-breeding phase of their life cycle.
4. Abundance of each species within the project area:
  - abundant = many flocks or individuals seen throughout the area at all times of day.
  - common = a few flocks or well scattered individuals throughout the area.
  - uncommon = only one flock or several individuals seen within the project area.
  - rare = only one or two seen within the project area.

COMMON NAME

#### MAMMALS

|                          |                                |                     |          |
|--------------------------|--------------------------------|---------------------|----------|
| Pig                      | <i>Sus scrofa</i>              | non-native          | abundant |
| Mongoose                 | <i>Herpestes auripunctatus</i> | non-native          | uncommon |
| 'ōpē'ape'a, Hawaiian bat | <i>Lasius cinereus semotus</i> | endemic, Endangered | rare     |

#### BIRDS

|                      |                               |            |          |
|----------------------|-------------------------------|------------|----------|
| Zebra dove           | <i>Geopelia striata</i>       | non-native | common   |
| Japanese white-eye   | <i>Zosterops japonicus</i>    | non-native | uncommon |
| Chestnut mannikin    | <i>Lonchura malacca</i>       | non-native | uncommon |
| Nutmeg mannikin      | <i>Lonchura punctulata</i>    | non-native | uncommon |
| Spotted dove         | <i>Streptopelia chinensis</i> | non-native | rare     |
| House finch          | <i>Carpodacus mexicanus</i>   | non-native | rare     |
| Red-billed leiothrix | <i>Leiothrix lutea</i>        | non-native | rare     |
| Hwamei               | <i>Garrulus canorus</i>       | non-native | rare     |
| Kali pigeon          | <i>Lophura leucomelanos</i>   | non-native | rare     |



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Appendix *C*

{ Archaeological Impact Assessment }

AN ARCHAEOLOGY INVENTORY SURVEY REPORT  
ON 1,738.377 ACRES IN MALANAHAE, KAPOAULA, KAPULENA,  
WAI'ALE'ALE 1<sup>ST</sup> AND 2<sup>ND</sup>, WAIKŌLOA 1<sup>ST</sup> AND 2<sup>ND</sup>, NIUPUKA, AND  
HANAPAI AHUPUA'A, HĀMĀKUA DISTRICT, ISLAND OF HAWAII  
[TMK: (3) 4-7-05:01, 02, and 03, and (3) 4-7-06: 01, 05, 06, 07, 10, 18, and 20 ]

Prepared by:

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May 2010 Draft

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**ABSTRACT**

At the request of PBR Hawaii and Associates, (SCS) conducted an archaeological inventory survey on a 1,738.377-acre parcel [TMK: (3) 4-7-05:01, 02, and 03, and (3) 4-7-06: 01, 05, 06, 07, 10, 18, and 20 ] in the *ahupua'a* of Malanahae, Kapoaula, Kapulena, Wai'ale'ale 1<sup>st</sup> and 2<sup>nd</sup>, Wai'ale'ale 1<sup>st</sup> and 2<sup>nd</sup>, Niupuka, and Hanapai, *mauka* of Kapulena in Hāmākua District, Hawaii Island. The parcel extends from 960ft (293m) to 2,160ft (659m) above mean sea level (amsl).

Scientific Consultant Services (SCS), Inc. conducted an archaeological inventory survey of the property to identify and evaluate historical properties pursuant to state cultural resource management regulations (HAR § 275 and 276). Seventeen sites comprised of 28 features were recorded during the archaeological inventory survey. Four of the sites (28388, 28391, 28392, and 28394) were rockshelters used intermittently for temporary habitation during the pre-Contact Era. One site (28385) was a disturbed multi-tier platform that might be the remains of a *heiau* known to have existed in Kapulena Ahupua'a. The vast majority of features (n=20) were rock mounds, terraces, rock walls, and drainage ditches associated with Historic Era sugarcane cultivation.

Three stratigraphic trenches (3.0m square total) and eight test-units (6.25m square total) were excavated at eight sites. All of the sites were assessed as significant under criterion D as outlined in Hawaii Administrative Rules §13-275-6. Site 28385 was also assessed as significant under criterion E. Data recovery is recommended at Site 28385 to determine if the platform is the remains of a *heiau*. If future data recovery determines it is a *heiau*, a preservation plan will be written to protect and interpret the site. Documentation obtained during the present study was sufficient to determine the temporal association and function of all of the other sixteen sites. No further work is recommended for any of the features at the remaining sixteen sites.



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#### INTRODUCTION

At the request of PBR Hawaii and Associates, Scientific Consulting Services (SCS) conducted an archaeological inventory survey on a 1,738.377-acre parcel [TMK: (3) 4-7-05-01, 02, and 03, and (3) 4-7-06: 01, 05, 06, 07, 10, 18, and 20] in the *aliupua'a* of Malanahae, Kapaula, Kapulena, Wai'ale'ale 1<sup>st</sup> and 2<sup>nd</sup>, Waikōloa 1<sup>st</sup> and 2<sup>nd</sup>, Niupuka, and Hanapai, *mauka* of Kapulena in Hāmākua District, Hawai'i Island (Figure 1, 2, and 3). The parcel extends from 960ft (293m) to 2,160ft (659m) above mean sea level (amsl). The project area was used for over one hundred years to grow sugarcane. The parcel was last owned by the Hamakua Sugar Company and is presently owned by Hawai'i County.

Scientific Consultant Services (SCS), Inc. conducted an Archaeological Inventory Survey of the property to identify and evaluate historical properties pursuant to state cultural resource management regulations (HAR § 275 and 276). Seventeen sites comprised of 28 features were recorded during the archaeological inventory survey. Four of the sites (28388, 28391, 28392, and 28394) were rockshelters used intermittently for temporary habitation during the pre-Contact Era. One site (28385) was a disturbed multi-tier platform that might be the remains of a *heiau* known to have existed in Kapulena Ahupua'a. The vast majority of features (n=20) were rock mounds, terraces, rock walls, and drainage ditches associated with Historic Era sugarcane cultivation.

#### PHYSICAL SETTING

The project is approximately 960ft (293m) to 2,160ft (659m) above mean sea level (amsl). The substrate is Mauna Kea lava flows that are more than 10,000 years old (Wolfe and Morris 1996). The three soil types identified in the project area are Honokaa series silty clay loam (HsD, HsE, and HTD) with 0% to 30% slopes. Kukaiau series silty clay loam (KuD and KuE) with 12% to 20% slopes, and rough broken land (RB) along the steep narrow gulches (Sato *et al.* 1973). Annual rainfall is from 80 to 120 inches. The project area slopes primarily to the north and slightly to the east.

Vegetation on the project area consists primarily of introduced grasses and trees, including guinea grass (*Urochloa maxima*), ironwood (*Casuarina equisetifolia*), and guava trees (*Psidium* sp.). The project area has been used as sugarcane fields since the early post-Contact times. Aerial photographs from 1990 show that the majority of the property was bulldozed and used for sugarcane agriculture (Figure 4). Non-native species of grass, brush, and trees are



presently growing in the fallow sugarcane fields.

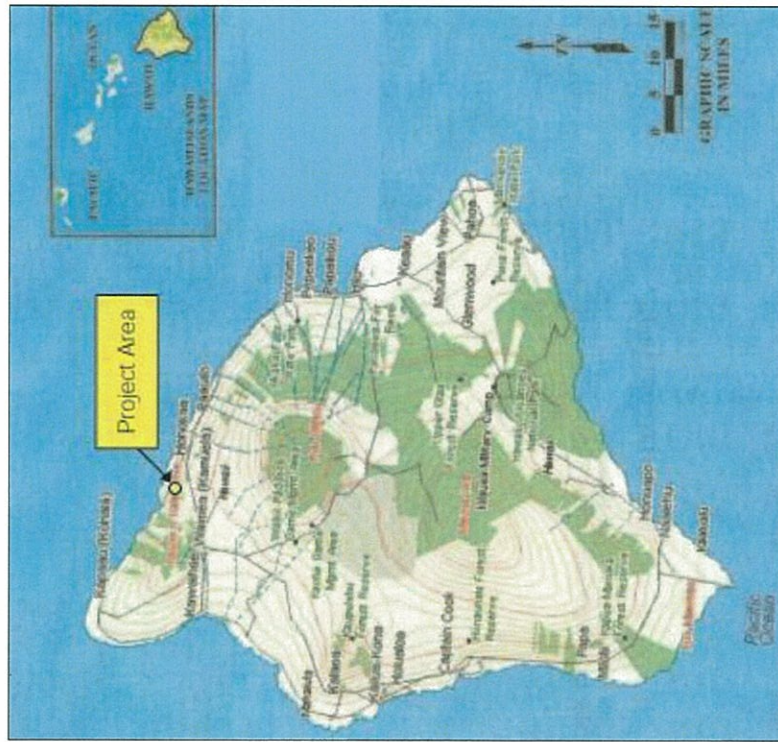


Figure 1: Hawaii Island Map Showing Project Area Location.

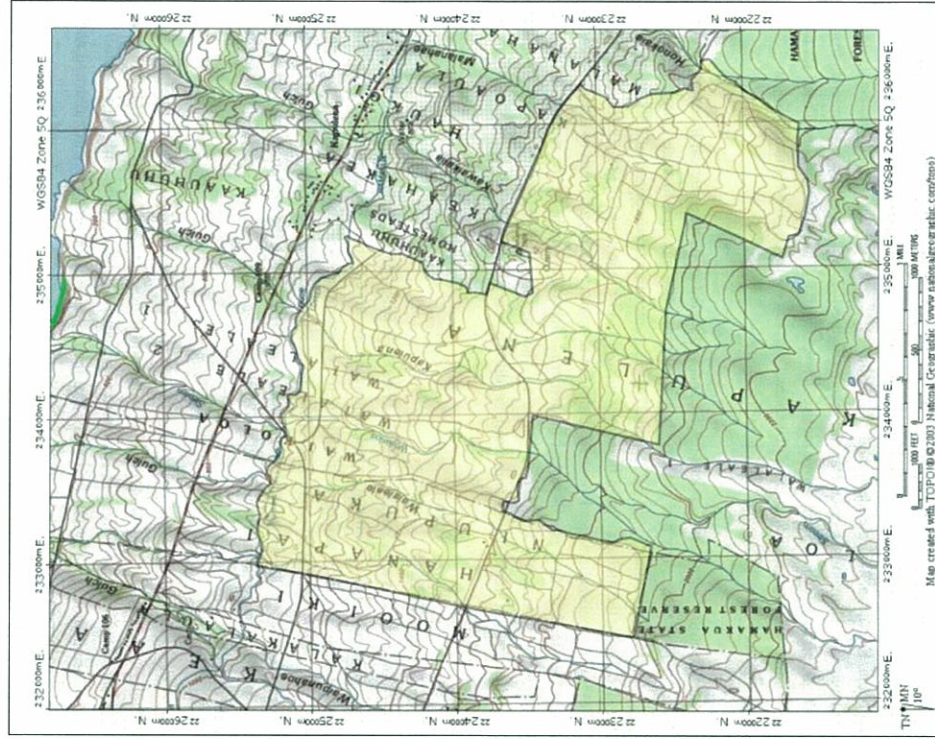


Figure 2: USGS TOPO Map Showing Project Area Location (Shaded Yellow).





Figure 4: Aerial Photograph of Project Area Showing Sugarcane Fields.

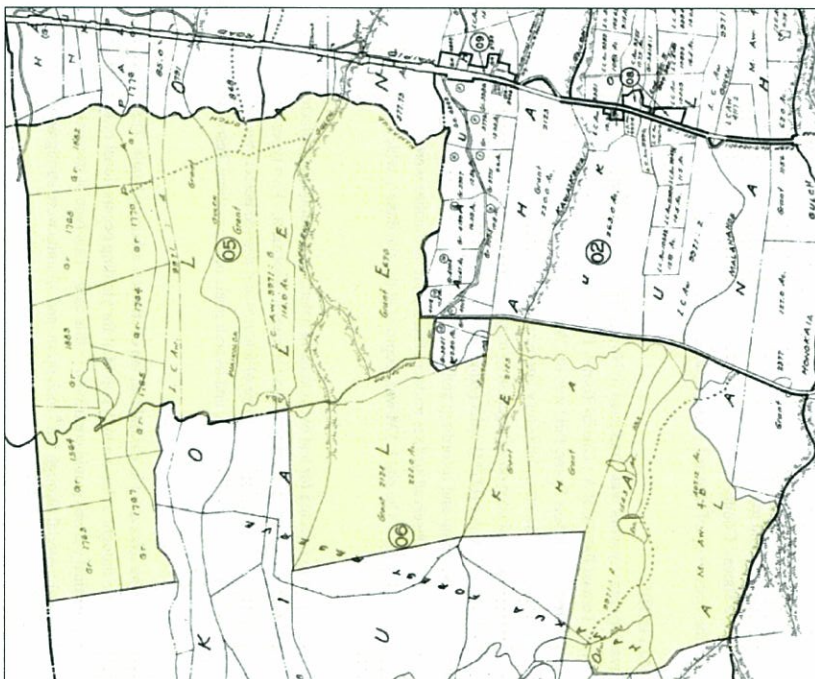


Figure 3: Location of Project Area (Shaded Yellow) on TMK: (3) 4-7 Map.

## METHODOLOGY

### **ARCHIVAL METHODS**

In addition to referencing available resources at SCS, archival research was conducted in the State Historic Preservation Division (SHPD) report database and library facility (Hilo, HI), the Hawaii County land records office, the *Waihoana 'Aina Mahele* database website, the Hawaiian collections holdings at the University of Hawai'i-Hilo Library, and the Hawaii State Library system. Archival work consisted of general research on the history and archaeology of the project area, as well as specific searches of previous archaeological studies in and around the subject parcel. Historic land use data, land ownership, maps, and narrative information were obtained from the Hawaii County land records office, the *Waihoana 'Aina Mahele* database website, and the University of Hawai'i, Hilo, Special Collections.

### **FIELD METHODS**

Inventory Survey work was conducted in November and December, 2009 (200 man-hours total) by Tomasi Patolo, B.A.; Guerin Tomei, B.A.; Jon Wilson, B.A.; and Glenn Escott, M.A. (Project Director). Robert Spear, PhD was the Principal Investigator for the project. There were four main field components to Inventory Survey process: pedestrian survey of the entire project area; plotting located sites on a project area map with Global Position System (GPS) Universal Transverse Mercator (UTM) units (Zone 5 North) using WGS84 datum for all four sites; individual site mapping and recording; and hand excavations. Survey was conducted along east/west traverse lines. Observed surface midden, features, or anomalies were assigned temporary feature numbers. The site UTM was recorded at the site datum, which is marked with a metal tag.

Some sites were selected for test excavation to determine several site characteristics including site function, construction method, and temporal placement. Two types of hand excavation were utilized depending on the size of features and desired percentage to be excavated, desired percentage of screening, and overall goals of excavation: Test Units (TU) and, Stratigraphic Trenches (ST).

Test-units were excavated in natural and ten centimeter arbitrary levels. These were used on features that were thought to have a high potential for yielding occupational or temporal data, and used where vertical control would contribute to this data. This type of excavation was screened for cultural material through 1/8" inch mesh, and all units were stratigraphically

profiled. A single 1.0 x 0.5 meter stratigraphic trench was excavated to examine soil stratigraphy and feature construction.

All excavated matrices were screened through both quarter inch and eighth-inch mesh. Cultural material was recorded by type on standard SCS excavation forms and collected. Soil colors were recorded using Munsell color charts, soil composition was recorded with the aid of the U.S. Department of Agriculture Soil Survey Manual on standard soil stratigraphy forms, and profiles were drawn. Overview photographs were taken of individual site features, sites, excavations, and the project area. Color photographs were taken with a 3.2 mega-pixel digital camera using a 20 cm long north arrow scale divided into 10 cm black and white increments.

### **LABORATORY METHODS**

Inventory of midden and artifacts collected from the text excavations were analyzed and weighed. All field notes, maps, cultural material, and photographs pertaining to this project are currently being curated at the SCS facilities on the Island of Hawai'i.

## CULTURAL AND HISTORICAL BACKGROUND

### **HAWAIIAN LAND DIVISIONS AND SETTLEMENT**

Initial settlement of the high Hawaiian Islands is believed to have occurred along the wetter and more fertile windward coasts where "conditions were optimal for marine and terrestrial exploitation along lines followed previously in Eastern Polynesia" (Green 1980:1). This exploitation involved inshore and pelagic fishing, gathering shellfish from the shore and strand, plant and animal husbandry, and the utilization of natural terrestrial flora and fauna (Kirch and Kelly 1975; Pearson *et al.* 1971; Kirch 1985). The pattern of this early settlement is thought to have consisted of widely spaced, permanent home bases that gradually expanded to form a nearly continuous zone of permanent settlement along the windward coasts as local populations grew.

There is a paucity of prehistoric information pertaining to the lands of the project area and surrounding lands (Cordy 2000:216-217). The project area is located in a traditionally sparsely populated area along the high cliffs of the Hāmākua coast. It has poor access to marine resources and is far from the sociopolitical population center of Hilo to the east, and just outside of the Waipi'o Valley and Waimea to the west. Though a coastal trail was used to travel along the Hāmākua, much of the travel between Hilo and Waipi'o was done by sailing canoe. The project areas is not at the nexus of a trail system, and much of the cross-island travel was



conducted on trails that crossed the saddle between Mauna Kea, Maun Loa, and Hualalai (Figure 5).

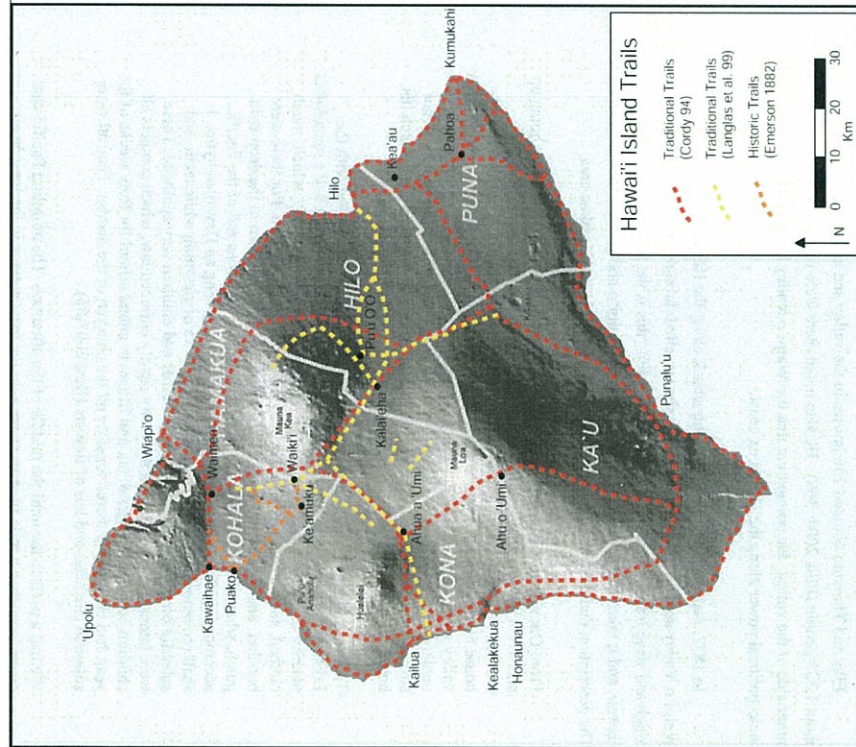


Figure 5: Hawaii's Island Trail Systems.

## WAIHI PANA (LEGENDARY PLACES)

The *ahupua'a* of Malanahae, Kapoaula, Kapulena, Wai'ale'ale 1<sup>st</sup> and 2<sup>nd</sup>, Waikōloa 1<sup>st</sup> and 2<sup>nd</sup>, Niupuka, and Hanapai are traditional Hawaiian land divisions situated between the 200 foot high cliffs of the Hāmākua coast and the uplands. Kapoaula and Waikōloa are the longest *mauka/makai* and reach elevations of roughly 3,000ft amsl and 2,600ft amsl, respectively. The remaining *ahupua'a* reach an upper elevation of approximately 1,600ft amsl. Kapulena is named for the king shark of Hāmākua (Pukui *et al.* 1974:90). Waikōloa is the name of a wind, and is the name of the gulch that runs through the *ahupua'a*. Waikōloa is translated literally as "water pulling far" (Pukui *et al.* 1974:223). Wai'ale'ale is translated literally as "rippling or overflowing water" (Pukui *et al.* 1974:220). No references to the names of the four remaining *ahupua'a* are available.

## PREHISTORIC AND HISTORIC ACCOUNTS OF THE KAPULENA AREA

No published prehistoric accounts of named places within the project area are recorded by Kamakau, I'i, Kalakaua, or Fournander. Cordy, using leaders of O'ahu and their exploits at Waipi'o, suggests that there was a ruling polity at Waipi'o that likely controlled lands of the Hāmākua (Cordy 2000: 141-142). Kamakau (1992) records that Kamehameha camped at Laupāhoehoe during his battles to conquer the Island of Hawai'i.

The Reverends William Ellis and Asa Thurston traveled through lands of the project area on their way to Waipi'o in 1823. They met a small group of people at Malanahae, and continued on to Kapulena where they preached to an assembly of about one hundred people (Ellis 2004:357). The path from Kapulena to Waipi'o was crooked and bordered on both sides by tall grass and well-cultivated "plantations." Ellis described the bottom of the Waipi'o Valley as

one continued garden, cultivated with taro, bananas, sugar-cane, and other productions of the island, all growing luxuriantly. Several large ponds were also seen in different directions, well stocked with excellent fish. A number of small villages, containing from twenty to fifty houses each, stood along the foot of the mountains, at unequal distances on each side, and extended up the valley till projecting cliffs obscured the view (Ellis 2004:360).

Ellis also visited several *heiau* at Waipi'o. It was said that one of the *heiau* was used by 'Umi a Liloa (ruled A.D 1600-1620) to make sacrifices after conquering the six *moku* of the Island of Hawai'i (Ellis 2004:366). Ellis also described Pakarana [Paka'alana *heiau*], the place of refuge (Pu'uhonua) at Waipi'o. The compound was smaller than that at Honaunau and had a



small house containing the bones of Līloa. Both King Kamehameha and King Liholiho made offerings at the small house when they visited Waipi'o (Ellis 2004: 367).

Ellis and Thurston counted 256 houses in the valley and estimated the population to be about 1,325 people (Ellis 2004: 368). He also noted there were populous villages on the coast on either side of the valley. He pointed out that the Waipi'o Valley has been historically a place of socio-political power along the Hāmākua coast.

In 1872, Isabella Bird traveled by horseback along the Hāmākua from Onomea to the Waipi'o Valley and described the landscape she travelled through. The journey was over very rough and steep trails, and took five days. Bird noted "this is the most severe road on horses on Hawaii, and it takes a really good animal to come to Waipi'o and go back to Hilo (Bird 2007:85). The description that follows underscores the sparsely populated Hāmākua area:

From Onomea to the place where we expected to find the guide, we kept going up and down the steep sides of ravines, and scrambling through torrents till we reached a deep and most picturesque gulch [Kawainui], with a primitive school-house at the bottom, and some grass-houses clustering under palms and papayas, a valley scene of endless ease and perpetual afternoon. Here we found that D.'s uncle, who was to have been our guide, could not go, because his horse was not strong enough, but her cousin volunteered his escort, and went away to catch his horse, while we tethered ours and went into the school-house.

This reminded me somewhat of the very poorest schools connected with the Edinburgh Ladies' Highland School Association, but the teacher had a remarkable paucity of clothing, and he seemed to have the charge of his baby, which, much clothed, and indeed much muffled, lay on the bench beside him. For there were benches, and a desk, and even a blackboard and primers down in the deep wild gulch, where the music of living waters, and the thunderous roll of the Pacific, accompanied the children's tuneless voices as they sang an Hawaiian hymn. I shall remember nothing of the scholars but rows of gleaming white teeth, and splendid brown eyes. I thought both teacher and children very apathetic. There were lamentably few, though the pretty rigidly enforced law, which compels all children between the ages of six and fifteen to attend school for forty weeks of the year, had probably gathered together all the children of the district. They all wore coloured chemises and leis of flowers (Bird 2007:85).

We had a perfect day until the middle of the afternoon. The dimpling Pacific was never more than a mile from us as we kept the narrow track in the long green grass; and on our left the blunt snow-patched peaks of Mauna Kea rose from the girdle of forest, looking so delusively near that I fancied a two-hours' climb would take us to his lofty summit. The track for twenty-six miles is just in and out of gulches, from 100 to 800 feet in depth, all opening on the sea, which sweeps

into them in three booming rollers. The candle-nut or kukui (aleurites triloba) tree, which on the whole predominates, has leaves of a rich deep green when mature, which contrast beautifully with the flaky silvery look of the younger foliage. Some of the shallower gulches are filled exclusively with this tree, which in growing up to the light to within 100 feet of the top, presents a mass and density of leafage quite unique, giving the appearance as if billows of green had rolled in and solidified there. Each gulch has some specialty of ferns and trees, and in such a distance as sixty miles they vary considerably with the variations of soil, climate, and temperature. But everywhere the rocks, trees, and soil are covered and crowded with the most exquisite ferns and mosses, from the great tree-fern, whose bright fronds light up the darker foliage, to the lovely maiden-hair and graceful selaginellas which are mirrored in pools of sparkling water. Everywhere, too, the great blue morning glory opened to a heaven not bluer than itself.

The descent into the gulches is always solemn. You canter along a bright breezy upland, and are suddenly arrested by a precipice, and from the depths of a forest abyss a low plash or murmur rises, or a deep bass sound, significant of water which must be crossed, and one reluctantly leaves the upper air to plunge into heavy shadow, and each experience increases one's apprehensions concerning the next. Though in some gulches the kukui preponderates, in others the lauhala whose aerial roots support it in otherwise impossible positions, and in others the sombre alia, yet there were some grand clefts in which nature has mingled her treasures impartially, and out of cool depths of ferns rose the feathery coco-palm, the glorious breadfruit, with its green melon-like fruit, the large ohia, ideal in its beauty,—the most gorgeous flowering tree I have ever seen, with spikes of rose-crimson blossoms borne on the old wood, blazing among its shining many-tinted leafage,—the tall papaya with its fantastic crown, the profuse gigantic plantain, and innumerable other trees, shrubs, and lianas, in the beauty and bounteousness of an endless spring. Imagine my surprise on seeing at the bottom of one gulch, a grove of good-sized, dark-leaved, very handsome trees, with an abundance of smooth round green fruit upon them, and on reaching them finding that they were orange trees, their great size, far exceeding that of the largest at Valencia, having prevented me from recognizing them earlier! In another, some large shrubs with oval, shining, dark leaves, much crimped at the edges, bright green berries along the stalks, and masses of pure white flowers lying flat, like snow on evergreens, turned out to be coffee! The guava with its obtuse smooth leaves, sweet white blossoms on solitary axillary stalks, and yellow fruit was universal. The novelty of the fruit, foliage, and vegetation is an intense delight to me. I should like to see how the rigid aspect of a coniferous tree, of which there is not one indigenous to the islands, would look by contrast. We passed through a long thicket of sumach, an exotic from North America, which still retains its old habit of shedding its leaves, and its grey, wintry, desolate-looking branches reminded me that there are less-favoured parts of the world, and that you are among mist, cold, murk, slush, gales, leaflessness, and all the dismal concomitants of an English winter.



It is wonderful that people should have thought of crossing these gulches on anything with four legs. Formerly, that is, within the last thirty years, the precipices could only be ascended by climbing with the utmost care, and descended by being lowered with ropes from crag to crag, and from tree to tree, when hanging on by the hands became impracticable to even the most experienced mountaineer. In this last fashion Mr. Coan and Mr. Lyons were let down to preach the gospel to the people of the then populous valleys. But within recent years, narrow tracks, allowing one horse to pass another, have been cut along the sides of these precipices, without any windings to make them easier, and only deviating enough from the perpendicular to allow of their descent by the sure-footed native-born animals. Most of them are worn by water and animals' feet, broken, rugged, jagged, with steps of rock sometimes three feet high, produced by breakage here and there. Up and down these the animals slip, jump, and scramble, some of them standing still until severely spurred, or driven by some one from behind. Then there are softer descents, slippery with damp, and perilous in heavy rains, down which they slide dexterously, gathering all their legs under them. On a few of these tracks a false step means death, but the vegetation which clothes the pali below, blinds one to the risk. I don't think anything would induce me to go up a swinging zigzag—up a terrible pali opposite to me as I write, the sides of which are quite undraped.

All the gulches for the first twenty-four miles contain running water. The great Hakalau gulch we crossed early yesterday, has a river with a smooth bed as wide as the Thames at Eton. Some have only small quiet streams, which pass gently through ferny grottoes. Others have fierce strong torrents dashing between abrupt walls of rock, among immense boulders into deep abysses, and cast themselves over precipice after precipice into the ocean. Probably, many of these are the courses of fire torrents, whose jagged masses of a-a have since been worn smooth, and channelled into holes by the action of water. A few are crossed on narrow bridges, but the majority are forded, if that quiet conventional term can be applied to the violent floundering by which the horses bring one through. The transparency deceives them, and however deep the water is, they always try to lift their fore feet out of it, which gives them a disagreeable rolling motion. (Mr. Brigham in his valuable monograph on the Hawaiian volcanoes quoted below, appears as much impressed with these gulches as I am.)

We lunched in one glorious valley, and Kalua made drinking cups which held fully a pint, out of the beautiful leaves of the *Arum esculentum*. Towards afternoon turbid-looking clouds lowered over the sea, and by the time we reached the worst pali of all, the south side of Laupahoehoe, they burst on us in torrents of rain accompanied by strong wind. This terrible precipice takes one entirely by surprise. Kalua, who rode first, disappeared so suddenly that I thought he had gone over. It is merely a dangerous broken ledge, and besides that it looks as if there were only foothold for a goat, one is dizzied by the sight of the foaming ocean immediately below, and, when we actually reached the bottom, there was only a narrow strip of shingle between the stupendous cliff and the resounding

surges, which came up as if bent on destruction. The path by which we descended looked a mere thread on the side of the precipice. I don't know what the word beetling means, but if it means anything bad, I will certainly apply it to that pali.

A number of disastrous-looking native houses are clustered under some very tall palms in the open part of the gulch, but it is a most wretched situation; the roar of the surf is deafening, the scanty supply of water is brackish, there are rumours that leprosy is rife, and the people are said to be the poorest on Hawaii (Bird 2007:87-91).

We moved on in single file at a jog-trot wherever the road admitted of it, meeting mounted natives now and then, which led to a delay for the exchange of nuhous, and twice we had to turn into the thicket to avoid what here seems to be considered a danger. There are many large herds of semi-wild bullocks on the mountains, branded cattle, as distinguished from the wild or unbranded, and when they are wanted for food, a number of experienced vaccheros on strong shod horses go up, and drive forty or fifty of them down. We met such a drove bound for Hilo, with one or two men in front and others at the sides and behind, uttering loud shouts. The bullocks are nearly mad with being hunted and driven, and at times rush like a living tornado, tearing up the earth with their horns. As soon as the galloping riders are seen and the crooked-horned beasts, you retire behind a screen. There must be some tradition of some one having been knocked down and hurt, for reckless as the natives are said to be, they are careful about this, and we were warned several times by travellers whom we met, that there were "bullocks ahead." The law provides that the vaccheros shall station one of their number at the head of a gulch to give notice when cattle are to pass through.

We jogged on again till we met a native who told us that we were quite close to our destination; but there were no signs of it, for we were still on the lofty uplands, and the only prominent objects were huge headlands confronting the sea. I got off to walk, as my mule seemed footsore, but had not gone many yards when we came suddenly to the verge of a pali, about 1,000 feet deep [Waipio], with a narrow fertile valley below, with a yet higher pali on the other side, both abutting perpendicularly on the sea. I should think the valley is not more than three miles long, and it is walled in by high inaccessible mountains. It is in fact, a gulch on a vastly enlarged scale. The prospect below us was very charming, a fertile region perfectly level, protected from the sea by sandhills, watered by a winding stream, and bright with fishponds, meadow lands, kalo patches, orange and coffee groves, figs, breadfruit, and palms. There were a number of grass-houses, and a native church with a spire, and another up the valley testified to the energy and aggressiveness of Rome (Bird 2007:94-95).

Bird's host in Waipio was Halemanu, a member of the legislature and the deputy sheriff. Halemanu expressed a sadness for the dwindling of the Hawaiian population. Forty years earlier (circa 1832) there were approximately 1,300 inhabitants in the Waipio Valley (Bird 2007:100).



At the time of Bird's visit there were no more than 200. Bird also wrote about a few of the major, traditional Hawaiian institutions established at Waipi'o, including:

the Puhonua, or place of refuge for all this part of the island. This, and the very complete one of Honaunau, on the other side of Hawaii, were the Hawaiian "Cities of Refuge." Could any tradition of the Mosaic ordinance on this subject have travelled hither? These two sanctuaries were absolutely inviolable. The gates stood perpetually open, and though the fugitive was liable to be pursued to their very threshold, he had no sooner crossed it than he was safe from king, chief, or avenger. These gates were wide, and some faced the sea, and others the mountains. Hither the murderer, the manslayer, the tabu-breaker fled, repaired to the presence of the idol, and thanked it for aiding him to reach the place of security. After a certain time the fugitives were allowed to return to their families, and none dared to injure those to whom the high gods had granted their protection.

In time of war, tall spears from which white flags were unfurled, were placed at each end of the enclosure, and until the proclamation of peace invited the vanquished to enter. These flags were fixed a short distance outside the walls, and no pursuing warrior, even in the hot flush of victory, could pursue his routed foe one foot beyond. Within was the sacred pale of pahu tabu, and anyone attempting to strike his victim there would have been put to death by the priests and their adherents. In war time the children, old people, and many of the women of the neighbouring districts, were received within the enclosure, where they awaited the issue of the conflict in security, and were safe from violence in the event of defeat. These puhonuas contain pieces of stone weighing from two to three tons, raised six feet from the ground, and the walls, narrowing gradually towards the top, are fifteen feet wide at the base and twelve feet high. They are truly grand monuments of humanity in the midst of the barbarous institutions of heathenism, and it shows a considerable degree of enlightenment that even rebels in arms and fugitives from invading armies were safe, if they reached the sacred refuge, for the priests of Keawe knew no distinctions of party.

In dreadful contrast to this place of mercy, there were some very large heiaus (or temples) here, on whose hideous altars eighty human sacrifices are said to have been offered at one time. One of the legends told me concerning this lovely valley is, that King Umi, having vanquished the kings of the six divisions of Hawaii, was sacrificing captives in one of these heiaus, when the voice of his god, Kuahilo, was heard from the clouds, demanding more slaughter. Fresh human blood streamed from the altars, but the insatiable demon continued to call for more, till Umi had sacrificed all the captives and all his own men but one, whom he at first refused to give up, as he was a great favourite, but Kuahilo thundered from heaven, till the favourite warrior was slain, and only the king and the sacrificing priest remained.

This valley of the "vanquished waters" abounds in legends. Some of these are about a cruel monster, King Hooku, who lived here, and whose memory, so far as he is remembered, is much execrated. It is told of him that if a man were said to have a handsome head he sent some of his warriors to behead him, and then hacked and otherwise disfigured the face for a diversion. On one occasion he ordered a man's arm to be cut off and brought to him, simply because it was said to be more beautifully tattooed than his own. It is fifty-four years since the last human sacrifice was exposed on the Waipio altars, but there are several old people here who must have been at least thirty when Hawaii threw off idolatry for ever (Bird 2007:100-101).

Bird also described the sugar plantation at Kaiwiki, east of the project area. It was one of the first sugar mills established on the Island of Hawai'i. The Hamakua Mill Company and the Pacific Sugar Mill Company had not yet been established at the time of her journey. Those two companies were established in 1877 and 1878, respectively. The Pacific Sugar Mill Company was located at Kukuihaele, and the Kaiwiki Mill Company was located further east at 'O'ākala. Her description of the Kaiwiki Mill follows:

Then there is the sugar plantation of Kaiwiki, with its patches of bright green cane, its flumes crossing the track above our heads, bringing the cane down from the upland cane-fields to the crushing-mill, and the shifting, busy scenes of the sugar-boiling season.

Then the track goes down with a great dip, along which we slip and slide in the mud to a deep broad stream. This is a most picturesque spot, the junction of two clear bright rivers, and a few native houses and a Chinaman's store are grouped close by under some palms, with the customary loungers on horseback, asking and receiving nuhohu, or news, at the doors. Our accustomed horses leaped into a ferry-scow provided by Government, worked by a bearded female of hideous aspect, and leaped out on the other side to climb a track cut on the side of a precipice, which would be steep to mount on one's own feet. There we met parties of natives, all flower-wreathed, talking and singing, coming gaily down on their sure-footed horses, saluting us with the invariable "Aloha." Every now and then we passed native churches, with spires painted white, or a native schoolhouse, or a group of scholars all ferns and flowers. The greenness of the vegetation merits the term "dazzling." We think England green, but its colour is poor and pale as compared with that of tropical Hawaii. Palms, candlenuts, ohias, hibiscus, were it not for their exceeding beauty, would almost pall upon one from their abundance, and each gulch has its glorious entanglement of breadfruit, the large-leaved ohia, or native apple, a species of *Eugenia* (*Eugenia Malaccensis*), and the pandanus, with its aerial roots, all looped together by large sky-blue convolvuli and the running fern, and is marvellous with parasitic growths.



The unique beauty of this coast is what are called gulches—narrow deep ravines or gorges, from 100 to 2,000 feet in depth, each with a series of cascades from 10 to 1,800 feet in height. I dislike reducing their glories to the baldness of figures, but the depth of these clefts (originally, probably, the scars caused by fire torrents), cut and worn by the fierce streams fed by the snows of Mauna Kea, and the rains of the forest belt, cannot otherwise be expressed. The cascades are most truly beautiful, gleaming white among the dark depths of foliage far away, and falling into deep limpid basins, festooned and overhung with the richest and greenest vegetation of this prolific climate, from the huge-leaved banana and shining breadfruit to the most feathery of ferns and lycopodiums. Each gulch opens on a velvet lawn close to the sea, and most of them have space for a few grass houses, with coconut trees, bananas, and kalo patches. There are sixty-nine of these extraordinary chasms within a distance of thirty miles!

I think we came through eleven, fording the streams in all but two. The descent into some of them is quite alarming. You go down almost standing in your stirrups, at a right angle with the horse's head, and up, grasping his mane to prevent the saddle slipping. He goes down like a goat, with his bare feet, looking cautiously at each step, sometimes putting out a foot and withdrawing it again in favour of better footing, and sometimes gathering his four feet under him and sliding or jumping. The Mexican saddle has great advantages on these tracks, which are nothing better than ledges cut on the sides of precipices, for one goes up and down not only in perfect security but without fatigue. I am beginning to hope that I am not too old, as I feared I was, to learn a new mode of riding, for my companions rode at full speed over places where I should have picked my way carefully at a foot's pace; and my horse followed them, galloping and stopping short at their pleasure, and I successfully kept my seat, though not without occasional fears of an ignominious downfall. I even wish that you could see me in my Rob Roy riding dress, with leather belt and pouch, a lei of the orange seeds of the pandanus round my throat, jingling Mexican spurs, blue saddle blanket, and Rob Roy blanket strapped on behind the saddle!

This place is grandly situated 600 feet above a deep cove, into which two beautiful gulches of great size run, with heavy cascades, finer than Foyers at its best, and a native village is picturesquely situated between the two. The great white rollers, whiter by contrast with the dark deep water, come into the gulch just where we forded the river, and from the ford a passable road made for hauling sugar ascends to the house. The air is something absolutely delicious; and the murmur of the rollers and the deep boom of the cascades are very soothing. There is little rise or fall in the cadence of the surf anywhere on the windward coast, but one even sound, loud or soft, like that made by a train in a tunnel.

We were kindly welcomed, and were at once "made at home." Delicious phrase! the full meaning of which I am learning on Hawaii, where, though everything has the fascination of novelty, I have ceased to feel myself a stranger. This is a roomy, rambling frame-house, with a verandah, and the door, as is usual

here, opens directly into the sitting-room. The stair by which I go to my room suggests possibilities, for it has been removed three inches from the wall by an earthquake, which also brought down the tall chimney of the boiling-house. Close by there are small pretty frame-houses for the overseer, bookkeeper, sugar boiler, and machinist; a store, the factory, a pretty native church near the edge of the cliff, and quite a large native village below. It looks green and bright, and the atmosphere is perfect, with the cool air coming down from the mountains, and a soft breeze coming up from the blue dreamy ocean. Behind the house the uplands slope away to the colossal Mauna Kea. The actual, dense, impenetrable forest does not begin for a mile and a half from the coast, and its broad dark belt, extending to a height of 4,000 feet, and beautifully broken, throws out into greater brightness the upward glades of grass and the fields of sugar-cane.

This is a very busy season, and as this is a large plantation there is an appearance of great animation. There are five or six saddled horses usually tethered below the house; and with overseers, white and coloured, and natives riding at full gallop, and people coming on all sorts of errands, the hum of the crushing-mill, the rush of water in the flumes, and the grind of the waggons carrying cane, there is no end of stir.

The plantations in the Hilo district enjoy special advantages, for by turning some of the innumerable mountain streams into flumes the owners can bring a great part of their cane and all their wood for fuel down to the mills without other expense than the original cost of the woodwork. Mr. A. has 100 mules, but the greater part of their work is ploughing and hauling the kegs of sugar down to the cove, where in favourable weather they are put on board of a schooner for Honolulu. This plantation employs 185 hands, native and Chinese, and turns out 600 tons of sugar a year. The natives are much liked as labourers, being docile and on the whole willing; but native labour is hard to get, as the natives do not like to work for a term unless obliged, and a pernicious system of "advances" is practised. The labourers hire themselves to the planters, in the case of natives usually for a year, by a contract which has to be signed before a notary public. The wages are about eight dollars a month with food, or eleven dollars without food, and the planters supply houses and medical attendance. The Chinese are imported as coolies, and usually contract to work for five years. As a matter of policy no less than of humanity the "hands" are well treated: for if a single instance of injustice were perpetrated on a plantation the factory might stand still the next year, for hardly a native would contract to serve again.

The Chinese are quiet and industrious, but smoke opium, and are much addicted to gaming. Many of them save money, and, when their turn of service is over, set up stores, or grow vegetables for money. Each man employed has his horse, and on Saturday the hands form quite a cavalcade. Great tact, firmness, and knowledge of human nature are required in the manager of a plantation. The natives are at times disposed to shirk work without sufficient cause; the native lunas, or overseers, are not always reasonable, the Chinamen and natives do not



always agree, and quarrels and entanglements arise, and everything is referred to the decision of the manager, who, besides all things else, must know the exact amount of work which ought to be performed, both in the fields and factory, and see that it is done. Mr. A. is a keen, shrewd man of business, kind without being weak, and with an eye on every detail of his plantations. The requirements are endless. It reminds me very much of plantation life in Georgia in the old days of slavery. I never elsewhere heard of so many headaches, sore hands, and other trifling ailments. It is very amusing to see the attempts which the would-be invalids make to lengthen their brief smiling faces into lugubriousness, and the sudden relaxation into naturalness when they are allowed a holiday. Mr. A. comes into the house constantly to consult his wife regarding the treatment of different ailments.

I have made a second tour through the factory, and am rather disgusted with sugar making. "All's well that ends well," however, and the delicate crystalline result makes one forget the initial stages of the manufacture. The cane, stripped of its leaves, passes from the flumes under the rollers of the crushing-mill, where it is subjected to a pressure of five or six tons. One hundred pounds of cane under this process yield up from sixty-five to seventy-five pounds of juice. This juice passes, as a pale green cataract, into a trough, which conducts it into a vat, where it is dosed with quicklime to neutralize its acid, and is then run off into large heated metal vessels. At this stage the smell is abominable, and the turbid fluid, with a thick scum upon it, is simply disgusting. After a preliminary heating and skimming it is passed off into iron pans, several in a row, and boiled and skimmed, and ladled from one to the other till it reaches the last, which is nearest to the fire, and there it boils with the greatest violence, seething and foaming, bringing all the remaining scum to the surface. After the concentration has proceeded far enough, the action of the heat is suspended, and the reddish-brown, oily-looking liquid is drawn into the vacuum-pan till it is about a third full; the concentration is completed by boiling the juice in vacuo at a temperature of 150 degrees, and even lower. As the boiling proceeds, the sugar boiler tests the contents of the pan by withdrawing a few drops, and holding them up to the light on his finger; and, by certain minute changes in their condition, he judges when it is time to add an additional quantity. When the pan is full, the contents have thickened into the consistency of thick gruel by the formation of minute crystals, and are then allowed to descend into an heater, where they are kept warm till they can be run into "forms" or tanks, where they are allowed to granulate. The liquid, or molasses, which remains after the first crystallization is returned to the vacuum pan and reboiled, and this reboiling of the drainings is repeated two or three times, with a gradually decreasing result in the quality and quantity of the sugar. The last process, which is used for getting rid of the treacle, is a most beautiful one. The mass of sugar and treacle is put into what are called "centrifugal pans," which are drums about three feet in diameter and two feet high, which make about 1,000 revolutions a minute. These have false interiors of wire gauze, and the mass is forced violently against their sides by centrifugal action, and they let the treacle whirl through, and retain the sugar crystals, which lie in a dry heap in the centre.

The cane is being flumed in with great rapidity, and the factory is working till late at night. The cane from which the juice has been expressed, called "trash," is dried and used as fuel for the furnace which supplies the steam power. The sugar is packed in kegs, and a cooper and carpenter, as well as other mechanics, are employed.

Sugar is now the great interest of the islands. Christian missions and whaling have had their day, and now people talk sugar. Hawaii thrills to the news of a cent up or a cent down in the American market. All the interests of the kingdom are threatened by this one, which, because it is grievously depressed and staggers under a heavy import duty in the American market, is now clamorous in some quarters for "annexation," and in others for a "reciprocity treaty," which last means the cession of the Pearl River lagoon on Oahu, with its adjacent shores, to America, for a Pacific naval station. There are 200,000 acres of productive soil on the islands, of which only a fifteenth is under cultivation, and of this large area 150,000 is said to be specially adapted for sugar culture. Herein is a prospective Utopia, and people are always dreaming of the sugar-growing capacities of the belt of rich disintegrated lava which slopes upwards from the sea to the bases of the mountains. Hitherto, sugar growing has been a very disastrous speculation, and few of the planters at present do more than keep their heads above water.

Were labour plentiful and the duties removed, fortunes might be made: for the soil yields on an average about three times as much as that of the State of Louisiana. Two and a half tons to the acre is a common yield, five tons, a frequent one, and instances are known of the slowly matured cane of a high altitude yielding as much as seven tons! The magnificent climate makes it a very easy crop to grow. There is no brief harvest time with its rush, hurry, and frantic demand for labour, nor frost to render necessary the hasty cutting of an immature crop. The same number of hands is kept on all the year round. The planters can plant pretty much when they please, or not plant at all, for two or three years, the only difference in the latter case being that the ratoon which springs up after the cutting of the former crop are smaller in bulk. They can cut when they please, whether the cane be tasselled or not, and they can plant, cut, and grind at one time!

It is a beautiful crop in any stage of growth, especially in the tasselled stage. Every part of it is useful—the cane pre-eminently—the leaves as food for horses and mules, and the tassels for making hats. Here and elsewhere there is a plate of cut cane always within reach, and the children chew it incessantly. I fear you will be tired of sugar, but I find it more interesting than the wool and mutton of Victoria and New Zealand, and it is a most important item of the wealth of this toy kingdom, which last year exported 16,995,402 lbs. of sugar and 192,105 gallons of molasses. [Footnote: In 1875 the export of sugar reached a total of 25,080,182 lbs.] With regard to molasses, the Government prohibits the manufacture of rum, so the planters are deprived of a fruitful source of profit. It is



really difficult to tear myself from the subject of sugar, for I see the cane waving in the sun while I write, and hear the busy hum of the crushing-mill [Bird 2007:72-78].

Bird was staying at the Onomea Plantation as a guest at the time. The Onomea Plantation was owned by her host Judge S.L. Austin who started the plantation in 1863 (Campbell and Ogburn 1990). A description of the Onomea Plantation works by Campbell and Ogburn (1990) is quoted below.

During the early days, Onomea's crushing plant was water driven. A metal water wheel and boiler had been shipped from Glasgow, Scotland in 1862. Water from the flumes provided the power to turn the wheel, which in turn moved the sugar cane crusher. The water-driven crushing plant was much larger and heavier than those of other mills. The mill was situated just below Papaikou at the foot of a gulch, which opened out to the ocean. It was the first nine-roller mill erected on the island. The mill was connected by rail to one of the best landings and loading devices on the coast. The sugar cars were hauled to the landing by a cable and sugar could be sent over the main cable to the hold of a ship without rehandling. By means of this device about 1,600 bags of sugar could be loaded in an hour.

A distinctive feature of Onomea was its system of flumes, which spanned gorges and carried cane down the slopes to the mill. Fifty-five miles of stationary and portable flumes were constructed. The trestle, which carried the main flume across Hanawainui Gulch, was the largest wooden bridge in the territory and the one spanning Kawainui Gulch was the highest, 176 feet. Onomea's location in a heavy rainfall belt made it difficult to mechanize cane harvesting and transportation easily. Onomea was one of the last plantations to stop hand cutting cane. However, progress was made and the extensive road building program begun in 1903 was finally completed in 1956.

The heavy rainfall also tended to wash topsoil away and leach it out. Onomea was the first Hawaiian sugar plantation to use commercial fertilizer on its fields. In 1879 (1897?), bone meal fertilizer was used to improve the soil. Later on Manager John T. Moir's protective efforts towards Onomea's topsoils resulted in the invention of a plow which was adapted to the peculiar topography of the county and the nature of the soil. The shallow, clay-like soils were subject to washing unless properly cultivated. It is to Moir's credit that no field was washed out to sea during his 20 years of management. He was also considered one of the leaders in the conservation of waste products and the use of them to build up the land.

The descriptions of the Kaiwika and Onomea plantations are good period descriptions of sugar plantations and operations in the area of the Hamakua Sugar Plantation that was soon to be operated within the project area.

#### NATIVE TESTIMONY BEFORE THE COMMISSION TO QUIET LAND TITLES

With the Mabele of 1848 and the two Acts of 1850, authorizing the sale of land in fee simple to resident aliens and the award of *kuleana* lands to native tenants, land tenure in Hawaii arrived at a significant turning point (Chinen 1961:13). Two Land Commission Awards were made within the project area. One half of Malanahae Ahupua'a was awarded to Simeonea Luluhiwalani (LCA 4; B, R.P. 7825). Two *'apana* (LCA 9971: A and B) in Waikōloa Ahupua'a were awarded to William Pitt Leleihoku. There is no descriptive information given for Leleihoku's two *'apana* in Waikōloa Ahupua'a. Luluhiwalani states in his claim in Malanahae that his right to the land was acquired when

Kamehameha II sailed to Kawaihae - this was Kaneuwaine [1819] - the land of the Ali'i was cut up there. Then the Ali'i gave Malanahae to Hikiau. Kaleimoku said "This land is for my *kaikaina*." Then the chiefs asked, "To whom?" To Keoua, he is a *kaikaina* of us all. Kaleimoku approved /saying/ "This is my very own *kaikaina*." Then the Ali'i gave this land to him absolutely. Keoua was with Keemoku at this time. /The land was held/ from this time. At the time in which Kamehameha II sailed for England, in the night Keoua died, and the next day the Ali'i sailed for England.

When he was alive, Keoua directly bequeathed all his lands to me. I am above, my *makua*line is below /one the lands held/ from Hawaii to Oahu. These are the land which I hereby present /as claims/ at this time (Waihoia 'Aina 2000).

#### THE HISTORY OF SUGAR IN HAWAII

Captain Cook found sugarcane (*Saccharum officinarum*) growing in Hawaii at the time of his arrival in 1778 (Beaglehole 1967:479). He noted that the cane was of large size and good quality. According to Hawaiians, sugarcane (*kō*) grew wild and quite well in the valleys and lowlands. It was not refined but was eaten as a food crop and was used as an offering, especially to the shark god *Mano* (Rolph 1917:166). Captain James King also noted that upon his arrival at Maui in 1778, Hawaiians came along ship carrying sugarcane as well as fruits and vegetables (Beaglehole 1967:497). Several sugarcane varieties, either indigenous or brought by early Polynesians, were known to the Hawaiians, including *Udalahu*, *Udalahu maoli* (native), *Honaula*, *Lanikena* (*Lanikona*), *Kea* (*Kokea*), *Papa*, and *Ohua* (Wilfong 1883).

The earliest instances of sugar and molasses production in Hawaii remain uncertain, but were likely small-scale sugar extraction operations. A number of important chiefs set aside land for several of these early endeavors (Kelly *et al.* 1981:81). Rolph (1917:166-167) documents the inception of organized sugar production as follows:



L. L. Torbert, one of the early planters, in a paper read before the Royal Agricultural Society in January, 1852, claims the earliest sugar factory was put up on the island of Lanai in 1802 by a Chinaman who came to the islands in one of the vessels trading for sandalwood. He brought with him a stone mill and boilers, and after grinding one small crop and making it into sugar, went away the next year taking his apparatus with him.

Anderson [Anderson, Rufus, *The Hawaiian Islands*, Boston, 1864] makes a statement that 257 tons of sugar were exported from the islands in 1814, but cites no authority upon which to base his assertion.

According to Jarves [Jarves, James Jackson, *History of the Sandwich Islands*, Honolulu, 1872] the first instance of the manufacture of sugar goes back to beyond 1820, but the name of the pioneer planter is unknown. It is certain that at first molasses was manufactured and then sugar some time before 1820.

Don Francisco de Paula made sugar in Honolulu in 1819, the year before the arrival of the first missionaries. Lavinia, an Italian, did the same thing in 1823. His method was to pound the cane with stone pestles on huge wooden trays (poi boards) by native labor, collecting the juice and boiling it in a small copper kettle.

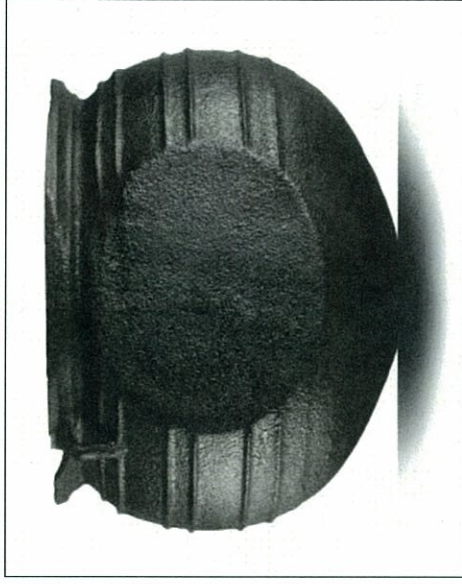
Accounts from various sources agree that the making of sugar and molasses was general in 1823-24. This undoubtedly had direct connection with the manufacture of rum, which was extensively carried on at the time.

In 1828 a considerable amount of cane was raised in the Nuuanu valley and Waikapu, Maui. A pioneer cane grower, Antonio Silva by name, lived at the latter place, and some Chinamen had a sugar mill near Hilo. In those days mills were made of wood, very crudely put together and worked by oxen.

Ladd & Company established the first large-scale sugar production in Hawai'i on Kauai, while David Malo operated a mill on Maui between 1840 and 1850, and Governor Kuakini directed the planting of one hundred acres of sugar cane in 1839 in Kohala, on the Island of Hawai'i (Rolph 1917:169). Missionaries at Hilo in the early 1800s produced sugar and molasses for their own use (Kelly *et al.* 1981:81). In 1841, a mill on the Wailuku River in Hilo on Governor Kuakini's land, and likely operated by Chinese, produced about 30 tons of sugar.

Sugarcane growing and milling operations were still simple. Cane fields were neither irrigated nor fertilized and sugar yields were roughly one ton per acre. Planting, by 'o'o (digging stick), and harvesting was done by Hawaiian contract workers (Thrum 1874:36). Laborers were paid in kind, often in cloth. Once at the milling facilities, cane was fed one stalk at a time into iron band reinforced wooden rollers powered by water, oxen, mule, and horse. The juice extracted by the rollers was collected in trough and was boiled in whaling ship iron trypots

(Figure 7). Less than 50% of the sugar was extracted from the cane using these methods. Additionally, production was low because indigenous sugarcanes were susceptible to introduced disease and were soft and therefore unsuitable for milling (Mangelsdorf 1956).



**Figure 6:** A Whaling Trypot Typical of Those Used For Making Raw Sugar.

Lahaina sugarcane, a variety indigenous to the Marquesas, was introduced to Hawai'i in 1854, and by 1870 had displaced all indigenous varieties for sugar production (Wilfong 1883). Hawaiian sugar production remained low despite the introduction of steam power in 1858-1859 to the milling process. The Island of Hawai'i had a single mill operating at Hilo until the outbreak of the American Civil War (1861-1865). The disruption of sugar production in the American south caused a price increase and a concomitant rise in Hawaiian sugar production and export, from 2,600 tons in 1863 to 8,869 tons in 1866 (Rolph 1917:171). The rapid growth of the sugar industry created a labor shortage that necessitated hiring contract laborers from other Polynesian islands.

Hawaiian sugar production was still somewhat hindered by U.S. import duties, until a reciprocity treaty negotiated between the Kingdom of Hawai'i and the U.S. in 1876 reduced import duties levied on Hawaiian sugar, increasing the profitability of sugar production and



further spurring the growth of the sugar industry. From 1877 to 1888, sugar production increased almost 500% and doubled in the following ten years (Kelly *et al.* 1981:81). American consumers purchased nearly 99% of all Hawaiian export products, much of it sugar.

In 1880 Rose Bamboo sugar cane was introduced from Australia and was grown at higher elevations on Hawai'i. Rose Bamboo cane did especially well on the relatively high table lands along the Hāmākua coast. Lahaina and Rose Bamboo varieties were susceptible to insects and disease and subsequently yields decreased annually until both varieties were completely replaced around the turn of the century by Yellow Caledonia cane (also called White Tanna cane), a variety named for New Caledonia and Tanna, an island of present day Vanuatu (Rolph 1917:170). Yellow Caledonia had been imported to Hawai'i in 1881 and was first grown with great success in Ka'u (Tew 1987). The variety was resistant to disease and grew well in cooler climates with moderately high rainfall, and consequently was cultivated with great success along the Hāmākua until its replacement in 1925 with hybrid varieties of sugarcane (James 2004:5).

The Hawaiian sugar industry continued to grow and additional contract laborers were hired from as far away as China and Japan (after 1890), and later from Korea, the Philippines, Puerto Rico, and Portugal. Sugar plantations began offering free medical care and rent-free housing to attract laborers. The annexation of Hawai'i by the U.S. in 1898 ensured the continued American consumer demand for Hawaiian sugar. Additionally, incorporation provided new funding for needed public works to improve the transportation and shipping facilities that made the sugar trade more profitable. The development of port facilities and the extensive railroad system that ran from Kalapana in South Puna to Pa'aui along the Hāmākua coast were a direct result of the sugar industry.

#### THE HISTORY OF SUGAR IN THE KAPULENA AREA

Seven sugar companies were established along the Hāmākua coast between 1869 and 1880, excepting Onomea Plantation in the Hilo area (Bouvet 2001:9). Geographically, from the Hilo to Kohala sides of the Hāmākua, they were the Laupahoehoe Sugar Company (est. 1880), the O'okala Sugar Plantation Company (est. 1869), the Kukaiau Sugar Company (est. 1887), the Hamakua Sugar Company (est. 1877), the Panuhau Sugar Company (est. 1878), the Honokaa Sugar Company (est. 1878), and the Pacific Sugar Mill Company (est. 1878).

#### PACIFIC SUGAR MILL COMPANY (1878-1928)

The Pacific Sugar Mill Company was established in 1878 at Kukuihaele and cultivated sugar cane in fields within the current project area. A good synoptic history published on the University of Hawai'i's Hawaiian Sugar Planters' Association Plantation Archives states that the

Pacific Sugar Mill was located on the northeast coast of the Island of Hawai'i between Honokaa and Waipio Valley. It extended along the coast for four miles and up the mountains from two to nine miles. The elevation ranged from 300 to 1,900 feet giving a variety of growing conditions. Half of the land was arable; the remainder was pasture and forests.

The beginnings of Pacific Sugar Mill are not entirely clear. A Charter of Incorporation (HSC 48/13 Doc #142) dated August 19, 1879 lists Samuel Parker and F.A. Schaefer as the founders. Other published sources cite Dr. Mott-Smith, Dr. Trousdale and Mr. Herbert Purvis as founders/proprietors of the enterprise. Material in the collection does confirm that the plantation was started in 1878 and the first crop harvested in 1880 with F.A. Schaefer and Co. as the agents.

Pacific Sugar Mill had the distinction of introducing the first mongoose into Hawai'i. In 1883 W.H. Purvis imported them from India and Africa for rat control on the plantation. Pacific Sugar Mill also experimented growing canaigre roots (tanners' dock) when Mr. J. Marsden, Commissioner of Agriculture, imported the seed of this plant in 1895. It was expected that the root would become a rich source of tannin for use in the leather industry. This was an early attempt to diversify and utilize land unsuitable for cane.

Most plantations had a small herd of cattle but Pacific Sugar Mill was unusual because it also had over 600 head of sheep. Free mutton was provided as a perquisite for employees along with free housing, fuel and medical care. As on most plantations, the early work force consisted of Chinese and native Hawaiians. Later on Japanese, Portuguese, Spaniards, Puerto Ricans, Koreans and Filipinos performed both as day laborers and contract workers.

By 1908 Pacific Sugar Mill had a nine-roller mill and produced an average crop of three tons per acre. The cane was delivered by flumes to a railroad, which traversed the plantation from east to west. The railroad was about four miles long and extended from the mill to Honokaa's boundary. Pacific Sugar Mill also had a wire rope landing to transport sugar bags to steamers for shipment.

The water for the flumes was obtained by diverting the Hilawe Stream, which had its source in the Kohala Mountains. Pacific Sugar Mill also had the water rights to Lalakea Stream and to Kukuihaele Valley Stream. The water was transported partly through a flume and partly by a ditch to a reservoir at the head of the plantation. Four more reservoirs with an estimated capacity of 50,000,000 gallons were also constructed. This supply of water not only enabled Pacific

Sugar Mill to transport all of its cane to the mill but was sufficient enough to enable Honokaa Sugar Company to flume 50% of its crop.

In spite of an abundant water supply, the plantation did not prosper due to mismanagement. In 1907 a glanders epidemic broke out because of poor conditions in the stables and most of the livestock had to be destroyed. The mill and housing were in serious disrepair. As part of a retrenchment effort in 1913, it was decided that the mill would be closed down and all the cane would be sent to Honokaa for grinding. At this time the administration of both plantations was brought under the manager in order to eliminate excess labor, machinery and costs. In 1916, Pacific Sugar Mill sold its mill equipment to Mitsui Company of Japan.

This partial merger with Honokaa proved to be such a success that a proposal was made for an amalgamation of all interests to ring about added savings and facilitate the economic management of the two plantations. Pacific Sugar Mill was formally dissolved on August 24, 1928 and became the Kukuihaele Division of Honokaa Sugar Company (Campbell and Ogburn 1989b).

#### HONOKAA SUGAR MILL COMPANY (1878-1928)

The Honokaa Sugar Company grew to encompass more than 9,000 acres (Campbell and Ogburn 1989a). The Honokaa Sugar Company had an extensive flume system to carry cane to railroad cars that brought the cane to the mill. The mill had a tramway that transported the bagged sugar to the warehouse at the boat landing. The sugar was then loaded onto steamships by means of a wire cable. The Honokaa Sugar Company was able to ship raw sugar directly to the mainland by this method, instead of first shipping to Honolulu.

#### DAVIES HAMAKUA SUGAR COMPANY (1978-1984) AND HAMAKUA SUGAR COMPANY (1984-1994)

The Laupahoehoe Sugar Company merged with the Honokaa Sugar Company in 1978 to form the Davies Hamakua Sugar Company (1978-1984). In 1984 the Davies Hamakua Sugar Company was bought by Francis Morgan and renamed the Hamakua Sugar Company (1984-1994). The Hamakua Sugar Company operated until October of 1994, and its closing marked the end of the sugar industry on the Island of Hawai'i.

#### PREVIOUS ARCHAEOLOGICAL INVESTIGATIONS

While no archaeological studies have been conducted in the current project area, several studies were conducted to the west and south of the current project area. Most archaeological studies undertaken in Hamakua District have focused on sites in the Waipi'o Valley.

The earliest archaeological study in this portion of Hamakua district is T.G. Thrum's *heiau* survey (Thrum 1908). Thrum's work notes that five *heiau* were known to have existed in the area (Thrum 1908:41). He visited the sites of two *heiau*, Kalelemauli and Pukiohuaka, both reported to be located in Kukuihaele Ahupua'a, but no longer in existence at the time of his visit. A third *heiau*, Kaiponihua, was said to exist at Ke-a [likely Kea'a Ahupua'a] between Kukuihaele and Kapulema. Two additional *heiau*, Punanamao and Hauola, were known to exist in Waiko'e'o'e.

John F.G. Stokes returned to Thrum's *heiau* sites and carried out more extensive mapping and recordation (Stokes 1919, Stokes and Dye 1991). Stokes work does not include Punanamao nor Kaiponihua *heiau*. In addition, he writes that Pukiohi'aka *heiau* was located 1400 feet above sea level in Kapulema Ahupua'a. He notes that the *heiau* was built by the *kahu* of Hi'aka for prayer, and not for sacrifice (Stokes and Dye 1991:162). The *heiau* was destroyed at some point prior to his visit. Stokes also writes that Kalelemauli *heiau* was located in Ke'ahakea Ahupua'a, though it was destroyed before his visit. The *heiau* was said to have been constructed by Kalelemauli, a high chief of Hamakua. The *heiau* was used for human sacrifice and was dedicated to Kū and Lono (Stokes and Dye 1991:162).

Stokes located a sixth *heiau* in the region, known as Hokuwelowelo *heiau* at Lalakea. He described the *heiau* as,

A small pen near the edge of the sea cliff overlooking the mouth of Waipio Valley. Its elevation is 900, and it is about 150 feet from the road, and the same distance from the edges of the sea-cliff and Waipio valley cliff. This *heiau* is said to have been "built by the gods," and was the place where the famous *Kiliapi* was guarded until the latter was stolen by the thief-dog, Puapualenalema from Puako (Stokes 1919).

Alfred E. Hudson published a description of the Hokuwelowelo *heiau* as part of archaeological work he conducted on the Island of Hawaii between 1930 and 1932. Hudson's description of the *heiau*, recorded as Site 4, is excerpted below.

The mound which is pointed [sic] as the site of this *heiau* is located on Waipio beach midway between the palis and about 30 feet beyond high tide level. The spot is generally known in the local tradition to have been occupied by a *heiau* and was specifically identified under this name by Mr. Kanekoa, age 76, and Mr. Haa, 70, who have always lived in the valley.



Hokuwelowelo as it stands at present consists of two elevated mounds connected by a somewhat lower one, the whole faced along the seaward side by a boulder wall in good condition, some portions of which also remain along the north and south sides. The tops of the mounds are level, covered with sand and grass, and extend inland about 50 feet to merge gradually with the sand dunes, making it impossible to judge the original width of the platform (Hudson 1932: 146).

Hudson's study also describes additional archaeological sites and features located in Waipi'o Valley, including Hanuula, Kaao Nui, and Moaula *heiau*, Pakaalana place of refuge; a fishing *koa*, walled enclosures, a burial ground, house platforms, and several trails. He also noted that at the time of his investigations, it appeared likely that many archaeological sites along the Hānākua Coast had been removed by sugarcane farming.

V.H. Loo and W.J. Bonk returned to the Waipi'o Valley and evaluated several of the sites documented by Hudson. They recommended preservation for Pakalana [Pakaalana] and Hokuwelowelo *heiau*, and the fishing *koa* documented by Hudson (Loo and Bonk 1971:2-3). During the period of their archaeological studies, the Kaao Nui *heiau* was damaged during grubbing and removal of vegetation nearby (*ibid*:26-27).

A 1977 archaeological study of the Waipi'o valley and Hamakua coast found that there is a scarcity of visible prehistoric habitation sites along the Hamakua due to modern agricultural practices, though subsurface deposits might still exist (Tanaka, Inc. and EDAW, Inc. 1977:65).

PHRI conducted an archaeological inventory survey of 1,303 acres of upland forest in 1990 (Walker, Kai, and Rosendahl 1991). Six sites were documented, primarily agricultural sites (66%), as well as transportation sites and indeterminate sites.

In 1991, PHRI conducted an archaeological inventory survey of portions of a 3,770-acre area of former Hamakua Sugar Company lands in the *ahupua'a* of Lalakea, Kukuhihale, Kanahonua, Waiko'eke'e, Kea'e, and Kalakala'ula (Head and Goodfellow 1991). That project area is just west of the current project area. PHRI study covered an area from the ocean below Kukuhihale town to an elevation of approximately 2,400ft amsl. Forty-four sites with 124 component features were documented (Head and Goodfellow 1991:12). Twenty of the sites had multiple features and twenty-four contained a single feature. Fifty percent of all sites were either agricultural (25%, n=11) or agricultural and habitation (25%, n=22) (Head and Goodfellow 1991:17). Nine solely habitation sites and five burials in a cemetery were also documented. The remaining sites were associated with transportation and various historical sugarcane agriculture

activities. The most predominant features were terraces (37.9%, n=47) and modified outcrops (14.5%, n=18). The majority of sites and features were modifications associated with sugarcane cultivation. A point of interest to the current archaeological study is that all but two of the sites were located below 1,600ft amsl.

PHRI conducted an additional archaeological inventory survey in 1991 (Franklin *et al.* 1994) within the project area reported in Head and Goodfellow 1991. The project area is situated from the coastal cliffs to roughly 850ft amsl. This inventory survey documented additional work at three previously identified sites (Head and Goodfellow 1991) and four newly identified sites. New sites included a historic residence, a burial complex, a trail, and a terrace. Several of the sites were associated with recorded Land Commission awards.

#### EXPECTED ARCHAEOLOGICAL RESOURCES

Based on previous archaeological projects conducted at similar elevations just west of the current project area, it is expected that Historic era sugar plantation features will be identified within the current project area. Pre-contact, traditional Hawaiian features are expected to be present only in undisturbed areas, such as in gulches and along the borders of sugarcane fields. The long-term and constant land-use associated with the sugarcane cultivation has likely destroyed or obscured most pre-Contact era archaeological sites. Pre-Contact era features within the gulches are likely to be temporary habitation sites with associated rockshelters, rock alignments, and terraces. Historic era agricultural features are likely to be modified outcrops, rock mounds, and rock concentrations associated with rock clearing of fields. Additionally, there might be rock alignments, rock walls, and terraces along the borders of the know sugarcane fields. Finally, based on oral interview, there are likely drainage and irrigation ditches dug into the ground surface within the fields.

#### ARCHAEOLOGICAL INVENTORY SURVEY RESULTS

Seventeen sites comprised of 28 features were recorded during the archaeological inventory survey (Table 1; Figure 7 and 8). Three of the sites (28382, 28383, and 28387) were located in TMK: (3) 4-7-06:01. The remaining fourteen sites were located in TMK: (3) 4-7-05:01. Nine of the sites were located in Kapulena Ahupua'a, five sites were identified in Waialeale 2 Ahupua'a, and two sites were recorded in Waikōloa Ahupua'a. Sixteen of the sites were at an elevation of between 1,200 and 1,600ft amsl, and one site was located at 1,150ft amsl. The majority of sites were clustered within or near the major gulches.



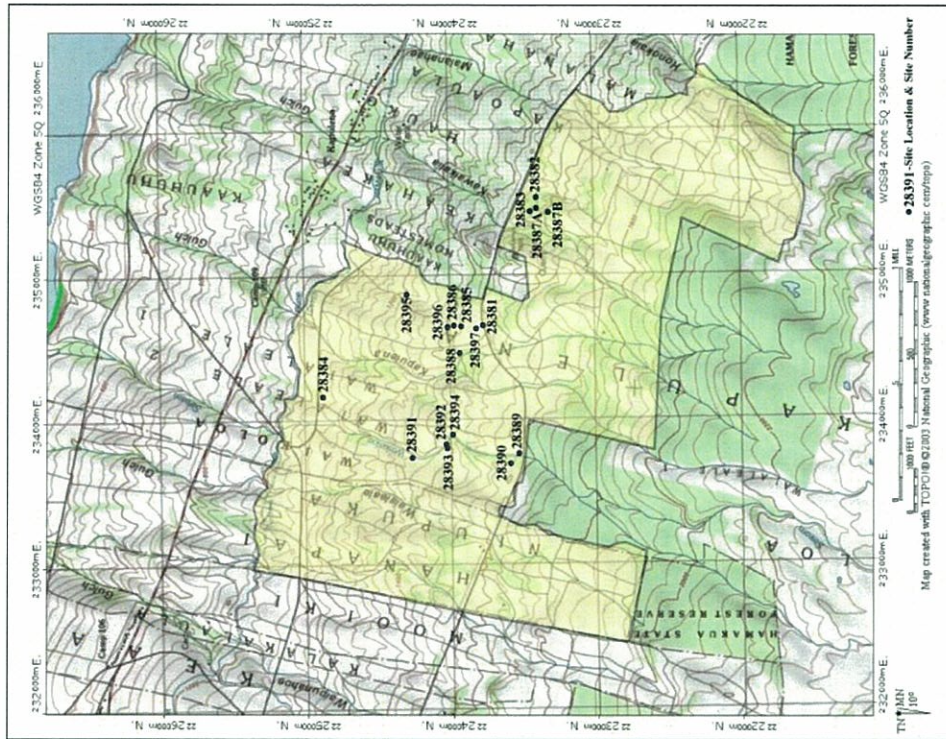


Figure 7: Location of Archaeological Sites on USGS Topo Map.

Table 1: Inventory of Sites in Project Area.

| Site # | Site Type                | Site Function         | Features | Shape       | Easting | Northing |
|--------|--------------------------|-----------------------|----------|-------------|---------|----------|
| 28381  | Rock Wall                | Boundary/Ag Clearing  | 1        | Linear N/S  | 234613  | 2223765  |
| 28382  | Ditch                    | Field Drainage        | 1        | Linear      | 235516  | 2223390  |
| 28383  | Rock Wall                | Boundary              | 1        | Linear      | 235416  | 2223440  |
| 28384  | Rock Mounds              | Agricultural Clearing | 3        | Rectangular | 234150  | 2224888  |
| 28385  | Platform                 | Poss. Heiau           | 1        | Rectangular | 234621  | 2223927  |
| 28386  | Rock Wall & Terrace      | Boundary/Ag Clearing  | 2        | Linear      | 234635  | 2223980  |
| 28387  | Ditch                    | Field Drainage        | 2        | Linear      | 235435  | 2223400  |
| 28388  | Rockshelter              | Temporary Habitation  | 3        | Rectangular | 234445  | 2223938  |
| 28389  | Terrace                  | Soil Retention        | 1        | Linear      | 233742  | 2223542  |
| 28390  | Rock Mound/Terraces      | Agricultural Clearing | 3        | Irregular   | 233678  | 2223596  |
| 28391  | Rockshelter              | Temporary Habitation  | 1        | Rectangular | 233743  | 2224276  |
| 28392  | Rockshelter              | Temporary Habitation  | 1        | Rectangular | 233809  | 2224034  |
| 28393  | Rock Walls               | Boundary              | 4        | Rectangular | 233780  | 2224004  |
| 28394  | Rockshelter              | Temporary Habitation  | 1        | Rectangular | 233864  | 2224004  |
| 28395  | Rock Mounds & Alignments | Agricultural Clearing | 1        | Rectangular | 234853  | 2224308  |
| 28396  | Terrace                  | Boundary/Ag Clearing  | 1        | Rectangular | 234618  | 2224029  |
| 28397  | Rock Mound               | Agricultural Clearing | 1        | Irregular   | 234612  | 2223826  |



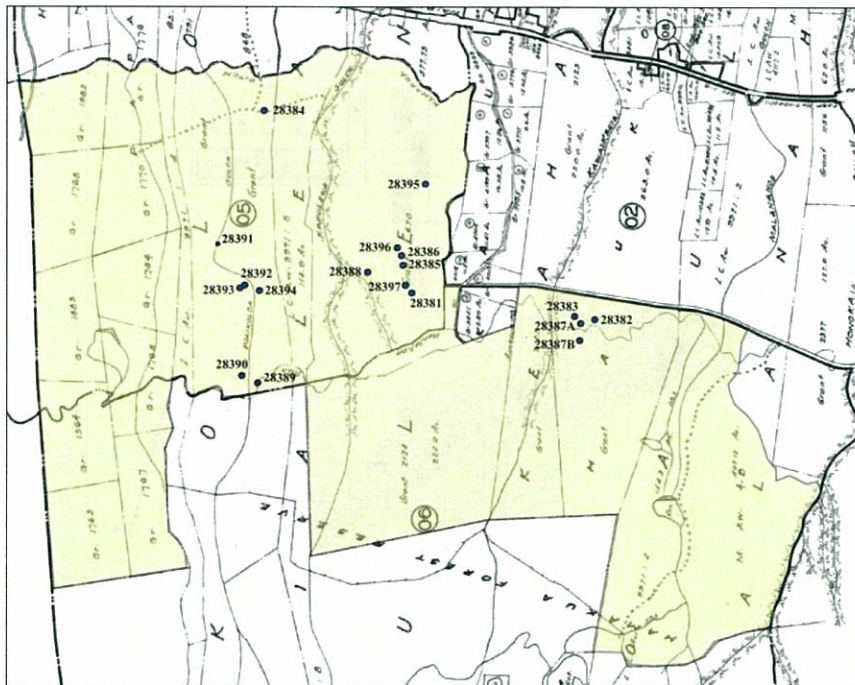
# **SITE 28381 (TS-1)**

**FORM** Linear Rock Concentration  
**FUNCTION:** Field Boundary/Rock Clearing  
**AGE:** Historic-Era  
**DIMENSIONS:** Length: 29.0m (N/S); Width: 6.0m; Height: 1.60m (max)  
**CONDITION:** Fair  
**SURFACE ARTIFACTS:** Beer Can on Surface  
**EXCAVATION:** None

# **SITE 28381**

Site 28381 is located along a *mauka/makai* (north/south) oriented ridgeline at an elevation of 1,475ft (450m) amsl in Kapulena Ahupua'a (see Figure 7). The ridgeline slopes downward to the north. Vegetation in the area is primarily ironwood. The site is a linear rock concentration constructed of piled and stacked angular and subangular basalt large cobbles and small boulders (Figure 9). The rock is loosely piled along the top of the ridge and is stacked as it proceeds down the west slope of the ridge. The west side of the rock concentration is faced in places. The north terminus of the wall ends at the base of the north-sloping ridgeline where it becomes level. The south end of the rock concentration was bulldozed during the construction of the cane haul road. There is a short bulldozer push pile along the north side of the cane haul road. There is no evidence of the wall on the *mauka* (south) side of the cane haul road.

The construction of the rock concentration is not similar to known wall construction. It appears that the rocks were removed (possibly by bulldozer or chain dragging) from the surrounding ground surface and pushed, or placed, along the ridgeline. Those that fell down the west slope of the ridge were stacked to keep them in place. Based on construction style, it is most likely that the rock concentration was created by sugarcane field clearing activities during the Historic-era. The rocks were either piled there because of shallow soil along the rocky ridge top, or it might be the border between two fields. The rock concentration has been impacted by the construction of the cane haul road and is in fair condition. The site has been fully documented and no further work is recommended.



**Figure 8:** Location of Archaeological Sites on TMK: (3) 4-7 Map.

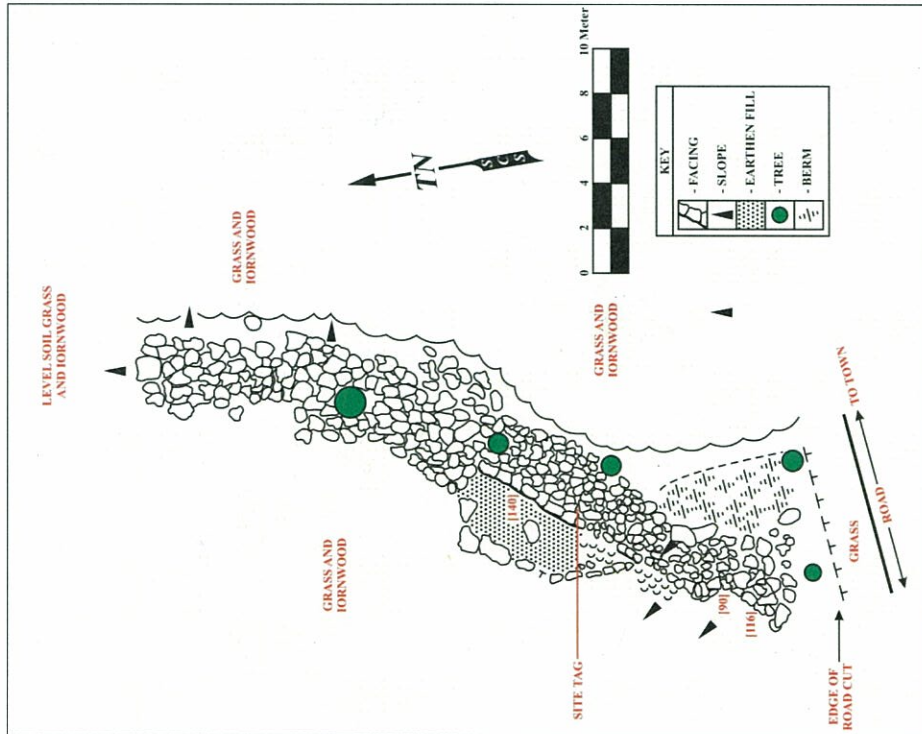


Figure 9: Site 28381 Plan View.

#### SITE 28382 (TS-2)

FORM: Earthen Ditch  
 FUNCTION: Drainage  
 AGE: Historic-Era  
 DIMENSIONS: Length: 200.0m (N/S); Width: 1.0m; Depth: 1.40m (max)  
 CONDITION: Good  
 SURFACE ARTIFACTS: None  
 EXCAVATION: None

#### SITE 28382

Site 28382 is located between two shallow gulches at an elevation of 1,520ft (463m) amsl in Kapulea Ahupua'a (see Figure 7). Vegetation in the area is guava, Christmas berry, various ferns, ginger, and grass—primarily disturbance vegetation. The site is a single earthen ditch dug into the hillside between two natural gulches (Figure 10). The ditches are roughly 0.6m to 0.8m wide and are approximately 0.5m to 1.4m deep. The down-slope side of the ditch is built up slightly with sediment removed from the ditch. The ditch follows the natural topography of the area. The ditch was constructed for sugarcane field drainage and is similar to others located within the project area. The ditch has been slightly impacted by weathering and is in good condition. The site has been documented and no further work is recommended.

#### SITE 28383 (TS-3)

FORM: Rock Wall  
 FUNCTION: Field Boundary/Rock Clearing  
 AGE: Historic-Era  
 DIMENSIONS: Length: 40.0m (N/S); Width: 0.8m; Height: 0.40m (max)  
 CONDITION: Poor  
 SURFACE ARTIFACTS: None  
 EXCAVATION: None

#### SITE 28383

Site 28383 is located along a *mauka/makai* (north/south) oriented ridgeline at the edge of a gulch at an elevation of 1,500ft (457m) amsl in Kapulea Ahupua'a (see Figure 7). Vegetation in the area is primarily guava—a disturbance vegetation. The rock wall is constructed of an outer perimeter of angular and subangular small boulders core-filled with angular and subangular large cobbles and small boulders (Figure 11).

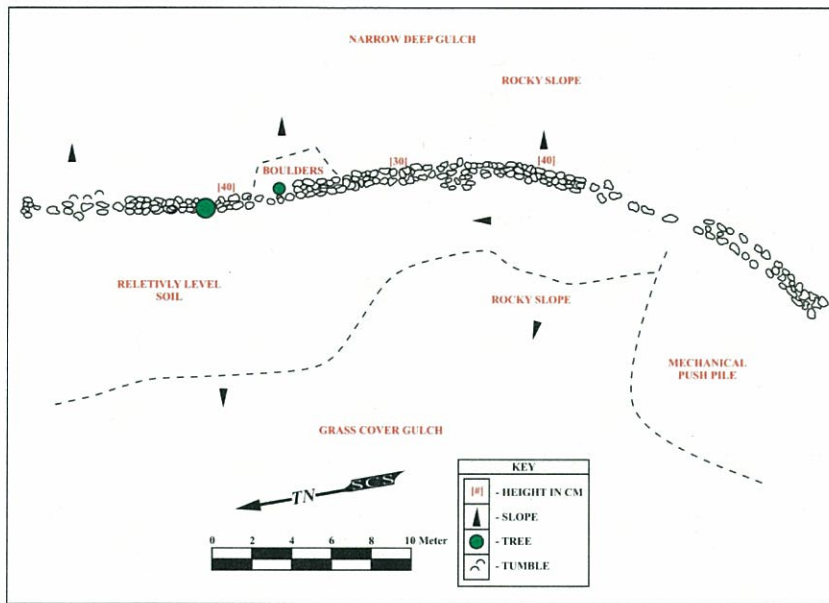


Figure 11: Site 28383 Plan View.

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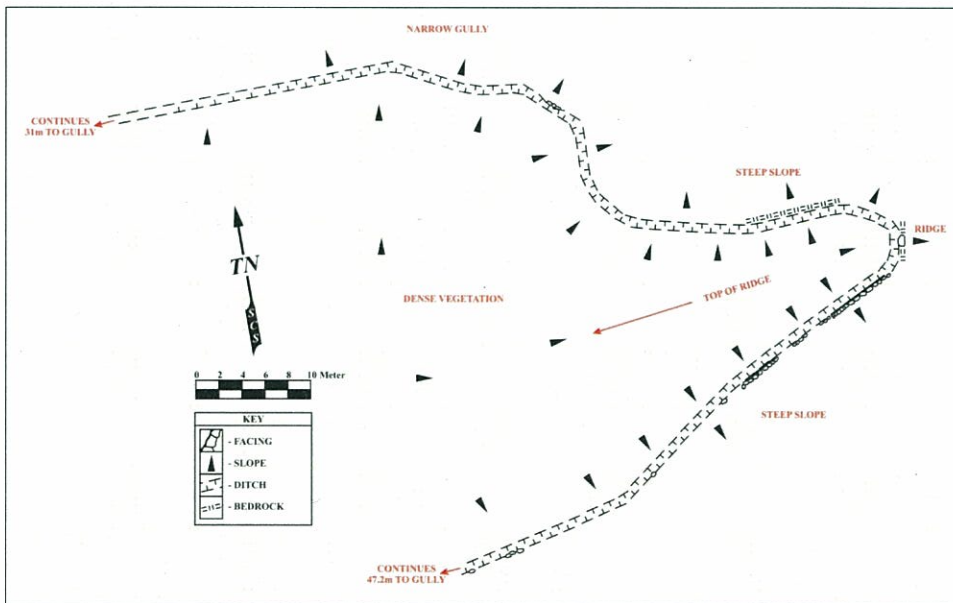


Figure 10: Site 28382 Plan View.

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The wall is primarily one course high but is stacked up to three courses high in some places. The entire feature has the appearance of an unfinished Historic-era wall. It was likely constructed with rock cleared from nearby sugarcane fields and was placed along the edge of the gulch. The wall has been impacted by regular field clearing and cane harvesting and is collapsed in places. There are also piles of rock from bulldozing near the wall. The wall is in poor condition. The site has been documented and no further work is recommended.

|                           |                                    |
|---------------------------|------------------------------------|
| <b>SITE 28384 (TS-4)</b>  | Rock Mounds & Terrace              |
| <b>FORM</b>               | Agricultural Rock Clearing         |
| <b>FUNCTION:</b>          | Historic-Era                       |
| <b>AGE:</b>               | Length: 12.0m (NW/SE); Width: 5.0m |
| <b>DIMENSIONS:</b>        | Good                               |
| <b>CONDITION:</b>         | Historic-Era Trash                 |
| <b>SURFACE ARTIFACTS:</b> | None                               |
| <b>EXCAVATION:</b>        |                                    |

#### SITE 28384

Site 28384 is located just south of a dirt road and a gulch at an elevation of 1,040ft (317m) amsl in Waialeale 2 Ahupua'a (see Figure 7). Vegetation in the area is a mix of *kukui*, ironwood, guava, *ti*, avocado, java plum, and various ferns and grasses. The site consists of three features, a rough terrace (Fe. 1), and two linear rock mounds (Fe. 2 and Fe. 3) constructed along the south edge of a gulch (Figure 12). There are several pieces of modern bottle glass, metal, and bulldozer push piles at the site.

#### Feature 1

Feature 1 is a linear terrace on the southwest edge of the site (Figure 13). The terrace measures 3.0m long (N/S) by 2.5m wide, and 0.58m in maximum height. The terrace is constructed of loosely piled angular and subangular cobbles and small boulders. There is a short section on the east side (along the gulch) that is stacked two courses high and is roughly faced. There is a section of two-inch metal pipe and a piece of plate metal on top of the terrace. The terrace has been slightly altered by weather and ungulates, and is in good condition.

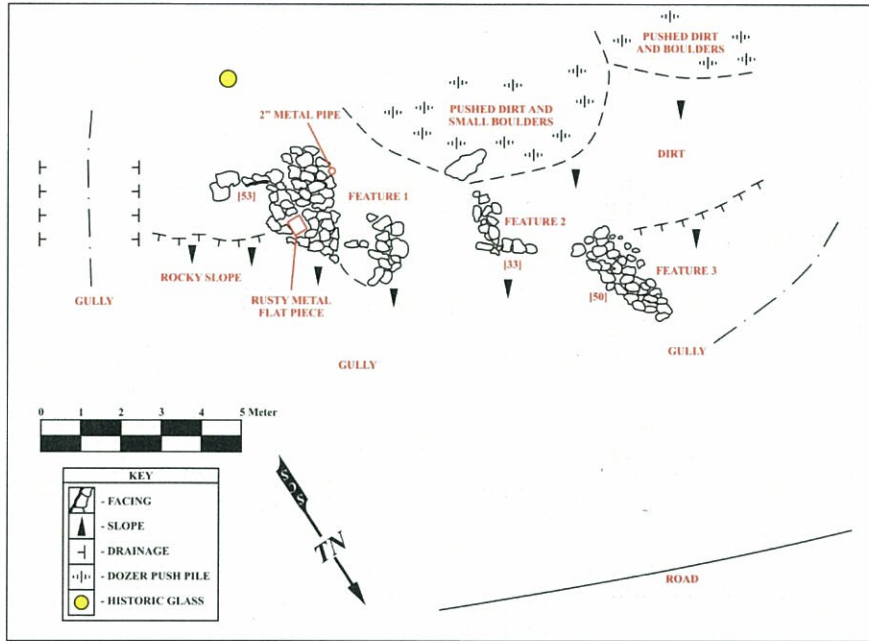


Figure 12: Site 28384 Plan View.





Figure 13: Photograph of Site 28384 Feature 1, View to West.

#### Feature 2

Feature 2 is a linear rock mound located roughly four meters northwest of Feature

1. The rock mound measures 2.0m long (N/S) by 0.60m wide and is 0.33m in maximum height. The rock mound is constructed of loosely piled angular and subangular large cobbles and small boulders. The rock mound has been slightly altered by weather and unglulates, and is in good condition.

#### Feature 3

Feature 3 is a linear rock mound located roughly one meter northwest of Feature

2. The rock mound measures 3.0m long (N/S) by 1.20m wide and is 0.50m in maximum height. The rock mound is constructed of loosely piled angular and subangular large cobbles and small boulders. The rock mound has been slightly altered by weather and unglulates, and is in good condition.

#### Site 28384 Summary

Site 28384 is the remains of clearing rock from the surrounding sugarcane fields. The rock was likely bulldozed to this location at the edge of the gulch. One of the rock mounds was slightly modified with facing to give it stability and the formal appearance of a terrace. The terrace might have been used as a work area, as evidenced by the metal and pipe found on its surface. The site has been fully documented and no further work is recommended.

#### **SITE 28385 (TS-5)**

|                    |   |
|--------------------|---|
| FORM               | Multi-Tiered Platform                                 |
| FUNCTION:          | Possible <i>Heiau</i> Remnant                         |
| AGE:               | Pre-Contact Era                                       |
| DIMENSIONS:        | Length: 29.0m (N/S); Width: 6.0m; Height: 1.60m (max) |
| CONDITION:         | Poor  |
| SURFACE ARTIFACTS: | Bottle Glass and Metal Cable on Surface               |
| EXCAVATION:        | Stratigraphic Trench 1 and Test-Units 1, 2, and 3     |

#### **SITE 28385**

Site 28385 is located at the top of a *mauka/makai* (N/S) oriented ridge line at an elevation of 1,440ft (439m) amsl in Kapulena Ahupua'a (see Figure 7). The area surrounding the site is old sugarcane fields dominated by ironwood. There are several

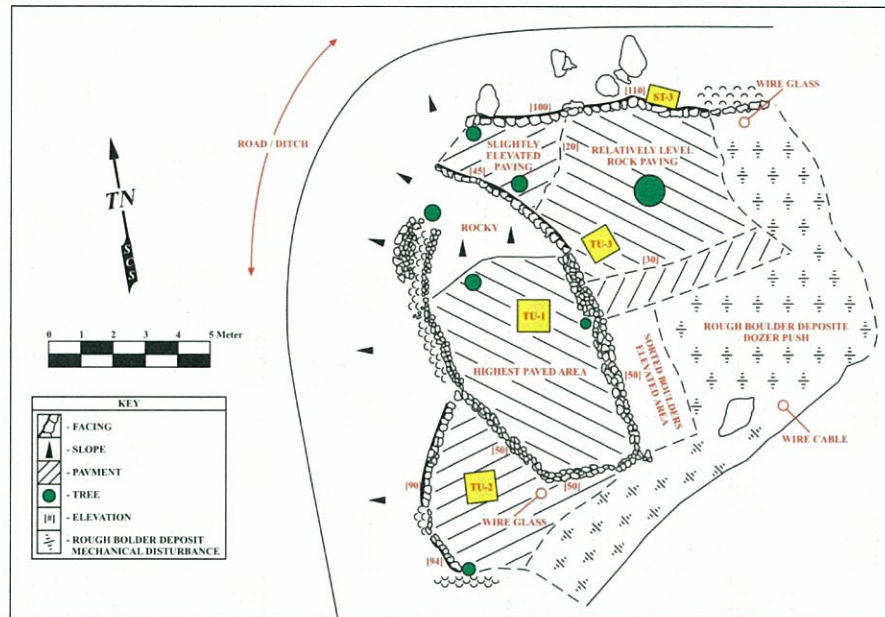


Figure 14: Site 28385 Plan View.

Christmas berry and guava trees growing on top of the platform. There is a sugarcane dirt road and ditch just west and north of the platform. The entire east and south sides of the platform have been truncated by bulldozer. It is possible that the remaining platform is only the west end or the northwest corner of a much larger structure.

The multi-tiered platform is constructed of angular and subangular cobbles and small boulders (Figure 14). The perimeter of each tier is constructed of large cobbles and small boulders and is well-faced (Figure 15 and 16). The interior top surface of each tier is level paving of angular and subangular small to large basalt cobbles (Figure 17). The large tier along the center of the west edge of the feature is roughly 0.5m higher than the paved tier along its southwest side, and is approximately 0.45m higher than the paved tier along its northeast side. The western tier measures roughly 10.0m long (N/S) by 5.0m wide. The southwest tier is roughly 6.0m long (N/S) by 6.0m wide. The northeast tier is roughly 11.0m long (E/W) by 7.0m wide. The northeast portion of the west tier is paved, as are portions of the outside perimeters of the northeast and southwest tiers.

The northeast and southwest tiers have been altered by bulldozers pushing portions of the feature and loose rock from the surrounding fields onto them. There is a length of one inch thick wire cable embedded in the soil and rock on the east side of the feature. The cable might have been attached to a bulldozer during clearing of the fields. There are also several pieces of clear bottle and jar glass on the top surface of the feature. The feature has been altered by sugarcane clearing activities and is in poor condition. Three one by one meter test-units and one 50cm by one meter stratigraphic trench were excavated at Site 28385 to determine the timing of function of the platform.

#### Stratigraphic Trench 1 (ST-1)

A 0.5 by 1.0m stratigraphic trench (ST-1) was excavated along the north face of the platform at Site 28385. ST-1 was excavated as two natural stratigraphic layers, was excavated to a maximum of 45cmbs, and terminated on a culturally sterile sediment (Figure 18).

Layer 1 (0-30cmbs) was loose very dark brown (10YR2/2) loam with a few medium size Christmas berry roots. No artifacts were recovered from Layer 1. The base of the platform architecture is along the top surface of Layer I, possibly due to erosion along the slope away from the feature and toward the road/ditch to the north.





Figure 16: Photograph of North Perimeter of Site 28385 Showing Facing, View to South.



Figure 15: Photograph North Perimeter of Site 28385, View to East.



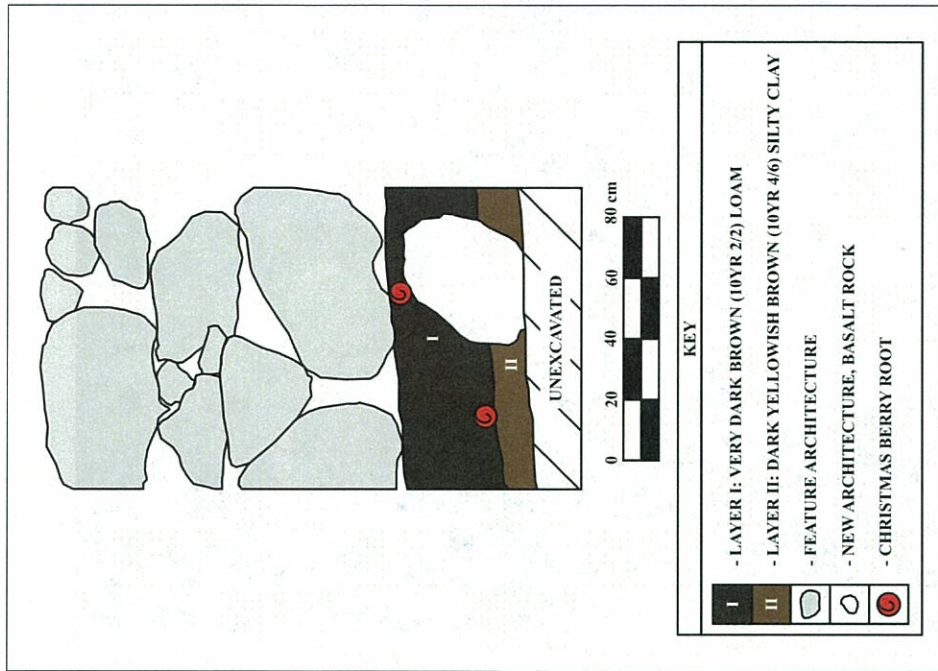


Figure 18: Site 28385, ST-1, South Profile.



Figure 17: Photograph of Site 28385 Showing Paving on Highest Tier, View to NW.



Layer II (30-45cmbs) was compact dark yellowish brown (10YR4/6) very fine to coarse silty clay with pedis and a few very small Christmas berry roots. No artifacts were recovered from Layer II. ST-1 was terminated at the top of a yellowish brown fine silt due to the lack of artifacts in both Layer I and Layer II.

#### Test-Unit 1 (TU-1)

Test-Unit 1 was a 1.0 by 1.0m unit excavated in the top of the highest paved tier of the platform at Site 28385 (see Figure 14). TU-1 was excavated as a single architectural layer. It was excavated to a maximum of 130cmbs, and terminated on soil and architectural rock. The unit was terminated because it was unstable and began to collapse. The architectural layer was piled angular and subangular cobbles to small boulders with small amounts of organic detritus and no roots. No internal structure or subsurface features were encountered. No artifacts were recovered from TU-1.

#### Test-Unit 2 (TU-2)

Test-Unit 2 was a 1.0 by 1.0m unit excavated in the paved area in the southwest corner of the platform at Site 28385 (see Figure 14). TU-2 was excavated as a single architectural layer. It was excavated to a maximum of 120cmbs, and terminated on soil and architectural rock. The unit was terminated because it was unstable and began to collapse. The architectural layer was piled angular and subangular cobbles to small boulders with small amounts of organic detritus and no roots. No internal structure or subsurface features were encountered. No artifacts were recovered from TU-2.

#### Test-Unit 3 (TU-3)

TU-3 was excavated in the top surface of the northern most paved area of the platform at Site 28385 (see Figure 14). TU-3 was excavated as an architectural layer and two natural stratigraphic layers (Figure 19). The unit was excavated to a maximum of 113cmbs, and terminated on a culturally sterile sediment.

The Architectural Layer (0-78cmbs) was piled angular and subangular cobbles to small boulders with small amounts of organic detritus and no roots. No internal structure or subsurface features were encountered. The base of the platform architecture is along the top surface of Layer I. No artifacts were recovered from the Architectural Layer.

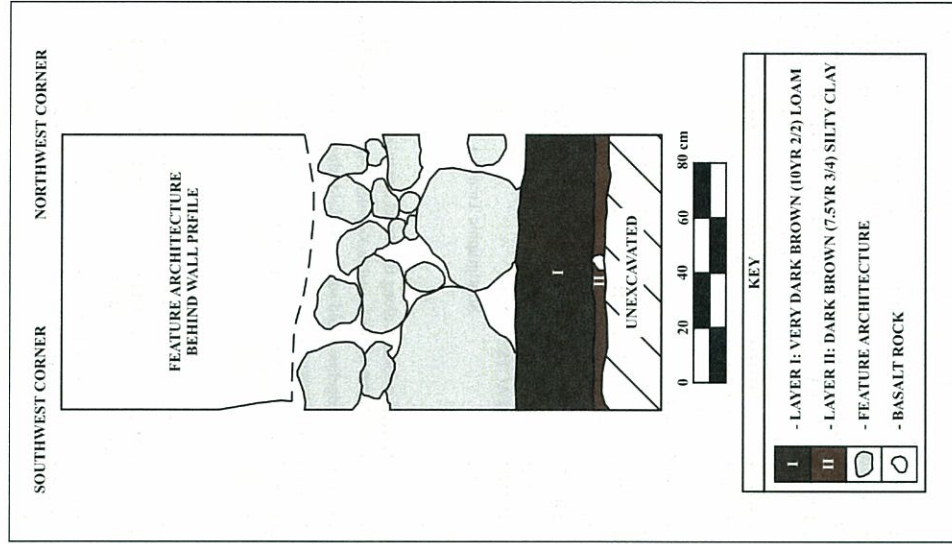


Figure 19: Site 28385, TU-3 Profile Facing West.

Layer I (78-108cbs) was loose very dark brown (10YR2/2) fine to coarse loam with peds, 5% small basalt cobbles, and a few small Christmas berry roots. A total of 10.8g of burnt wood fragments, a fragment of burnt *kukui* nut (0.4g), and a deposit of ash and charred matter (1.7g) were recovered from Layer I. The 1.7g of charred matter and ash, recovered from 90cbs in Layer I was sent for radiocarbon dating (Figure 20). The sample returned a 1-sigma date range of 1670 to 1780AD (46% likelihood) and 1800 to 1890AD (39% likelihood). The 2-sigma date range was from 1660 to 1960AD. Though the range is broad, the 1-sigma results suggests a late pre-Contact to early Historic provenience for the ash deposit and use of the platform.

Layer II (108-113cbs) was compact dark brown (7.5YR3/4) fine silty clay with a few small cobbles and very few small Christmas berry roots. No artifacts were recovered from Layer II. TU-3 was terminated at the top of a culturally sterile yellowish brown fine silt.

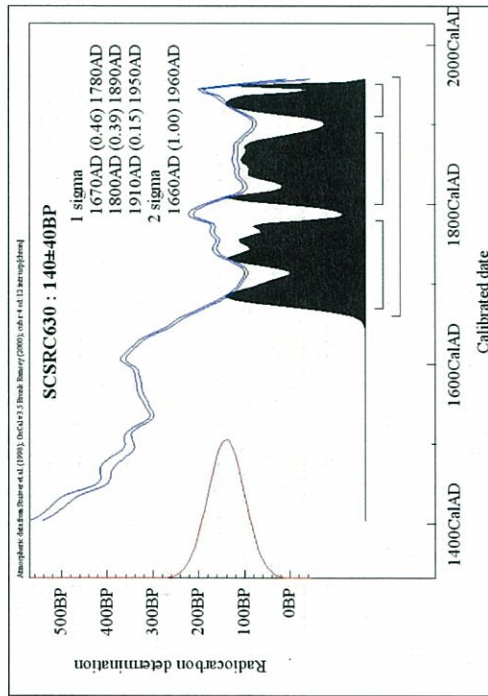


Figure 20: Site 28385, TU-3, Layer I Radiocarbon Dating Results.

Based on the amount of labor that went into the multi-tier platform at Site 28385, and based on the construction style and area of the feature, it is possible that this is the remains of Pukiohi'aka *heiau* located 1400 feet above sea level in Kapulena Ahupua'a (Stokes 1919). Evidence to support this hypothesis is the lack of midden and habitation remains commonly recovered at habitation sites. In fact, other than a very few historic and metal and glass artifacts, no other cultural material was identified at the site. The radiocarbon date recovered from TU-3 suggest a possible pre-Contact date for use of the platform as well. If Site 28385 is the remains of the Pukiohi'aka *heiau*, the platform has been severely impacted by sugarcane agricultural land-clearing practices and is in poor condition.

#### SITE 28386 (TS-6)

|                    |   |
|--------------------|---|
| FORM               | Terrace and Rock Mound                                |
| FUNCTION:          | Field Boundary/Rock Clearing                          |
| AGE:               | Historic-Era  |
| DIMENSIONS:        | Length: 28.0m (N/S); Width: 5.0m; Height: 1.30m (max) |
| CONDITION:         | Good  |
| SURFACE ARTIFACTS: | None  |
| EXCAVATION:        | Stratigraphic Trench 1                                |

#### SITE 28386

Site 28386 is located along the top of a *mauka/nakai* (N/S) oriented ridgeline at an elevation of 1,418ft (432m) amsl in Kapulena Ahupua'a (see Figure 7). The level area surrounding the ridgeline is old sugarcane fields dominated by ironwood. There are several Christmas berry and guava trees, and grass growing on the ridgeline. The site consists of two features: a three sided terrace (Fe. 1) and a rock mound (Fe. 2) (Figure 21).

#### Feature 1

Feature 1 is a three sided terrace located at the north end of the site. The terrace measures 16.0m long (northwest/southeast) by 5.0m wide, and is 1.3m in maximum height. Feature 1 is constructed of an outer perimeter of large cobbles and small boulders. The interior of the northwest end contains a level paving of cobbles and a few small boulders. The north and east sides of the paved area is stacked and faced (Figure 22).





Figure 22: Photograph of Site 28386, Feature 1 North End, View to Southwest.

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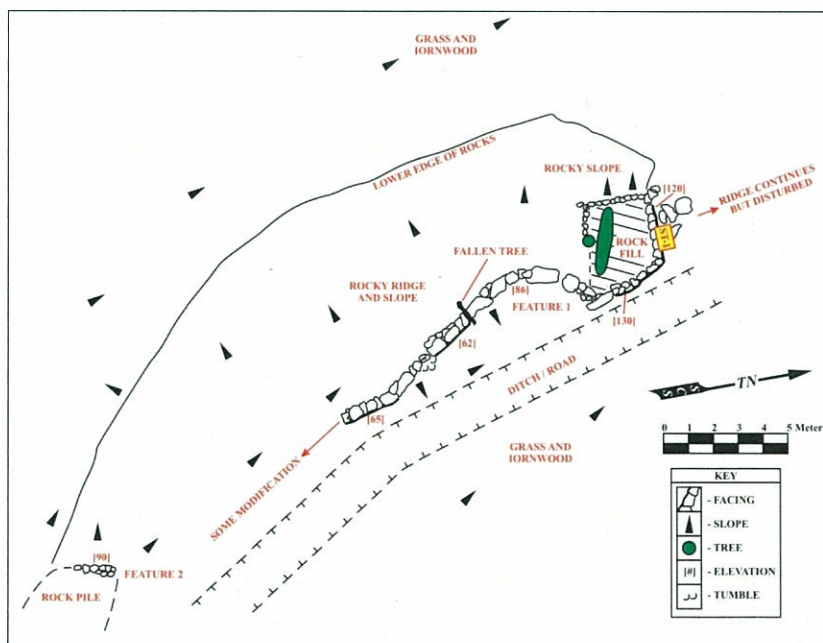


Figure 21: Site 28386 Plan View.

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The southeast end of the feature is constructed as a retaining wall along the east facing edge of the ridgeline. Portions of the wall are stacked and faced. The retaining wall portion of the feature retains the ridgeline soil. There are no artifacts on the feature or on the ground surface within the site. Feature 1 appears unaltered and is in good condition. A 0.5m by 1.0m stratigraphic trench was excavated along the north end of Feature 1 to determine its timing and function.

#### Stratigraphic Trench 1 (ST-1)

A 0.5 by 1.0m stratigraphic trench (ST-1) was excavated along the north face of the platform at Site 28385. ST-1 was excavated as two natural stratigraphic layers, was excavated to a maximum of 43cms, and terminated on a culturally sterile sediment and decomposing bedrock (Figure 23).

Layer I (0-33cms) was loose very dark brown (10YR2/2) loam with a few medium size Christmas berry roots. A small amount (0.4g) of small charred wood fragments were recovered from Layer I. The base of the platform architecture is along the top surface of Layer I, possibly due to erosion along the slope away from the feature and toward the road/ditch to the northeast.

Layer II (33-43cms) was compact dark yellowish brown (10YR4/6) very fine to coarse silty clay with peds and a few very small Christmas berry roots. No artifacts were recovered from Layer II. ST-1 was terminated at the top of a yellowish brown fine silt and decaying bedrock.

#### Feature 2

Feature 2 is an oval rock mound measuring 1.7m long (northwest/southeast) by 0.6m wide, and is 0.9m in maximum height. The mound is constructed of piled and stacked angular and subangular basalt cobbles and small boulders. The northeast edge of the rock mound is stacked and faced in places. There are no artifacts on or around

Feature 2. The southeast end of the rock mound has been impacted, possibly by bulldozer. Feature 2 has been altered by mechanical field clearing activities and is in fair condition.

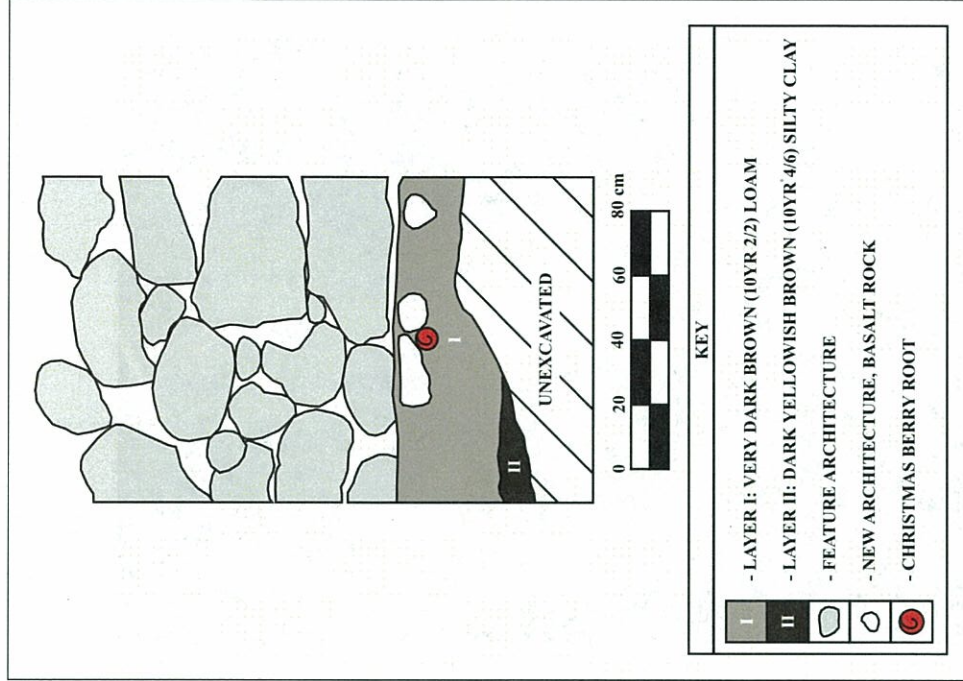


Figure 23: Site 28386, Feature 1, ST-1 South Profile.



#### Site 28386 Summary

Site 28386 appears to be the results of sugarcane field clearing. Rock was removed from the surrounding level fields and placed on the rocky ridgeline. The rock was stacked in order to keep it from rolling down the slope of the ridge. Some of the rock was stacked along the slope of the ridge to prevent erosion. This type of clearing is common on Historic-era sugarcane and ranch lands (Escott 2004, Wolforth and Chalmer 2007 draft). It is possible that the terrace marks a sugarcane field boundary. Site 28386 has been fully documented and no further work is recommended.

#### SITE 28387 (TS-7)

|                    |  |
|--------------------|--|
| FORM               | Earthen Ditch  |
| FUNCTION:          | Irrigation   |
| AGE:               | Historic-Era   |
| DIMENSIONS:        | Length: 200.0m (N/S); Width: 70.0m; Depth: 1.00m (max) |
| CONDITION:         | Fair   |
| SURFACE ARTIFACTS: | None   |
| EXCAVATION:        | None   |

#### SITE 28387

Site 28387 is located between a shallow gulch to the east and an old sugarcane field on the west, at an elevation of 1,560ft (476m) amsl in Kapulena Ahupua'a (see Figure 7). Vegetation in the area is guava, Christmas berry, various ferns, ginger, and grass—primarily disturbance vegetation. The site consists of two earthen ditches (Fe. 1 and Fe. 2) dug into the hillside between a natural gulch and an old sugarcane field (Figure 24 and 25). The ditches are roughly 0.6m to 0.8m wide and are approximately 0.5m to 1.0m deep. Feature 1 is located at the north end of the site and measures roughly 70.0m long. Feature 2 is located at the south end of the site and measures 150.0m long. There is a 12.0m long section of Feature 2 that is rock-lined along its east bank. The down-slope sides of the ditches are built up slightly with sediment removed from the ditch. The ditches follow the natural topography of the area. The ditches were constructed for sugarcane field drainage and are similar to others located within the project area. The ditches have been impacted by weathering, are silted in, and are in fair condition. The site has been documented and no further work is recommended.

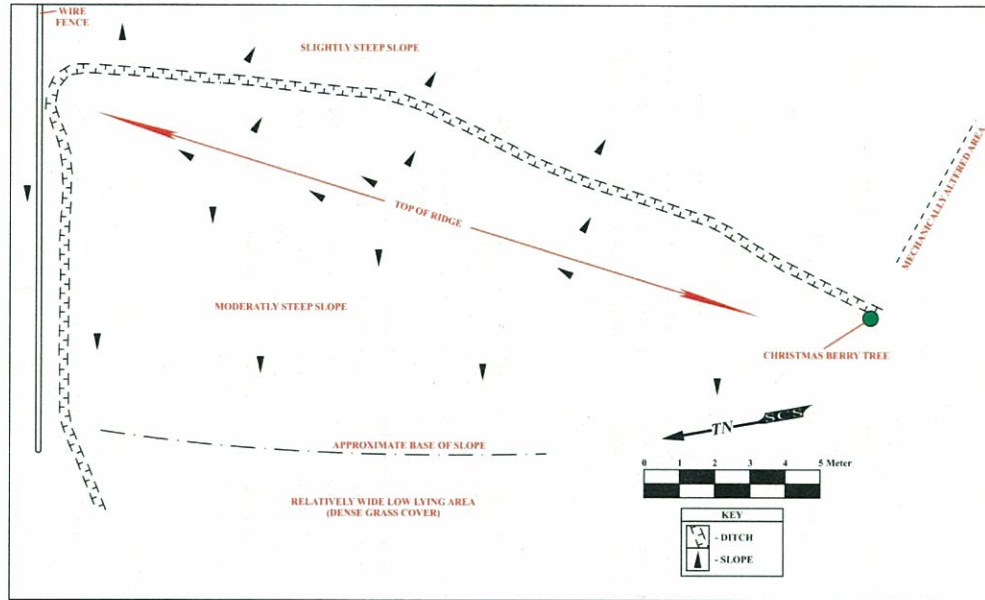


Figure 24: Site 28387 Feature 1 Plan View.

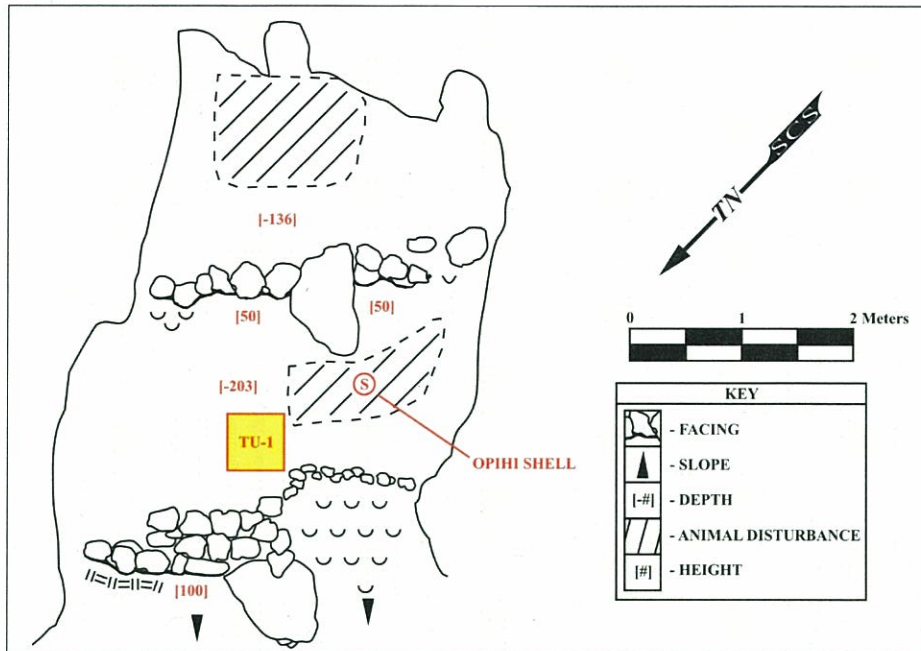
|                    |                                       |
|--------------------|---------------------------------------|
| FORM               | Rockshelters                          |
| FUNCTION:          | Temporary Habitation                  |
| AGE:               | Pre-Contact Era                       |
| DIMENSIONS:        | Length: 32.0m (E/W); Width: 13.0m     |
| CONDITION:         | Fair                                  |
| SURFACE ARTIFACTS: | <i>Opili</i> Shell and Metal Fragment |
| EXCAVATION:        | Test-Unit 1                           |

Site 28388 is located along the northeast edge of the Kapulena Gulch at an elevation of 1,415ft (431m) amsl in Kapulena Ahupua'a (see Figure 7). Vegetation in the area is guava, banyan, coffee, ginger, and thimble berry. The site consists of two rockshelters (Fe. 1 and Fe. 2) and a rock mound (Fe. 3) (Figure 26). A metal fragment was located on the gulch bottom approximately 8.0m west of Feature 2.

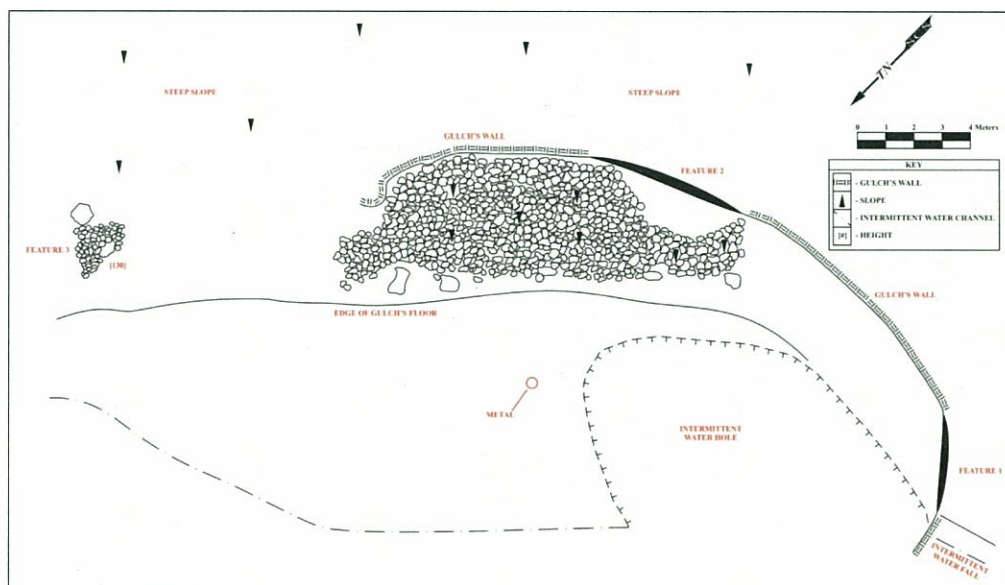
Feature 1 is a rockshelter located in the gulch wall at the southeast end of the site (Figure 27). The rockshelter is 4.7m long (northwest/southeast) by 4.0m wide, and is 2.03m in maximum height. The rockshelter opening is approximately 4.0m wide and faces to the northwest. There are two linear terraces (an exterior and interior) within the rockshelter. The exterior terrace is 3.0m long (N/S) by 0.1m to .5m wide, and is 1.0m high above the gulch floor outside the rockshelter. The interior terrace is 2.8m long (N/S) by 0.3m wide, and is 0.5m in maximum height. Both terraces are constructed of angular and subangular basalt cobbles and small boulders piled and stacked two to five courses high. A single *opithi* shell was located on the loose sediment floor of the rockshelter. The rockshelter floor has been slightly disturbed by pigs and the rockshelter is in fair condition. A 0.5 by 0.5m test-unit was excavated at Feature 1 to determine the timing and function of Site 28388.

A 0.5 by 0.5m test-unit (TU-1) was excavated near the entrance to the Feature 1 rockshelter. TU-1 was excavated as two natural stratigraphic layers, was excavated to a maximum of 34cmbs, and terminated on a culturally sterile sediment and decomposing bedrock (Figure 28).





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Layer I (0-12cmbs) was loose and wet very dark brown (10YR2/2) sandy silt with 20% pebbles and small cobbles, and less than 1% very fine roots. A small amount (2.5g) of small charred wood fragments and a small fragment (0.1g) of burnt *kukui* nut were recovered from Layer I. The base of Layer I was clear and slightly waxy.

Layer II (12-34cmbs) was loose and wet very dark gray (10YR3/1) fine to coarse silt with 20% pebbles to medium-size cobbles and no roots. A small amount of charred wood fragments (3-2g) were recovered from the top of Layer II along the northwest edge of TU-1. ST-1 was terminated at the top of decaying bedrock.

## Feature 2

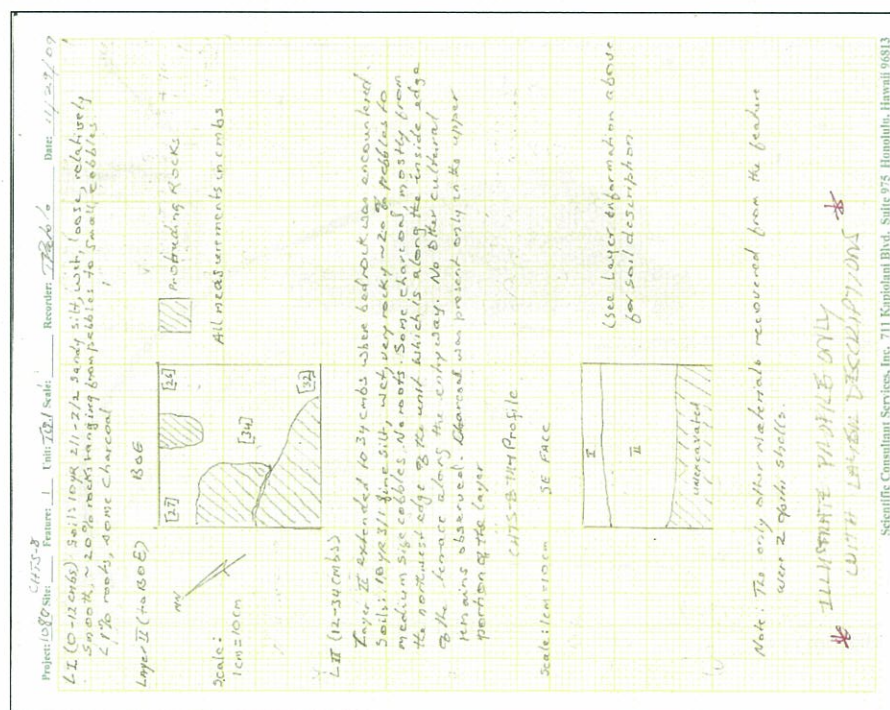
Feature 2 is a rockshelter located in the gulch wall at the center of the site. The rockshelter is 9.2m long (northwest/southeast) by 2.0m wide, and is 1.78m in maximum height. The rockshelter opens to the southwest. The interior floor surface is loose sediment and scattered rocks. No artifacts were located at Feature 2. The rockshelter floor has been disturbed by pigs and the rockshelter is in fair condition.

### Feature 3

Feature 3 is a square rock mound located at the northwest end of the site. The rock mound is 3.0m long (N/S) by 3.0m wide and is 1.3m in maximum height. Feature 3 is constructed of loosely piled angular and subangular cobbles and small boulders. No stacking or facing is evident in the feature construction. The feature might be natural, but appears to intentionally piled. Feature 3 appears unaltered and is in good condition.

## Site 28388 Summary

Feature 1 likely functioned as a limited temporary habitation or rest stop for people traveling up and down Kapulena gulch. Feature 2 might have used in the same manner. The rock mound (Feature 3) might mark the location of the rockshelters. The presence of an *opithi* shell suggests Feature 1 was used during the prehistoric-era. Subsurface testing was not conducted in Feature 2 because of the extensive animal disturbance to the deposits within the rockshelter. The Feature 1 rockshelter at this site and two other rockshelter sites with more intact deposits were tested. Site 28388 has been fully documented and no further work is recommended.



**Figure 28: Site 28388, Feature 1, TU-1 Southeast Profile.**



#### SITE 28389 (TS-9)

FORM Linear Terrace  
 FUNCTION Soil Retention  
 AGE Historic-Era  
 DIMENSIONS: Length: 13.0m (NE/SW); Width: 1.0m; Height: 1.5m (max)  
 CONDITION: Good  
 SURFACE ARTIFACTS: None  
 EXCAVATION: None

#### SITE 28389

Site 28389 is located immediately north of the cane haul road, and along the east bank of the Waikōloa Gulch at an elevation of 1,570ft (479m) amsl in Wai'ale'ale 2 Ahupua'a (see Figure 7). Vegetation in the area is rose apple—primarily a disturbance vegetation. The site is a linear terrace constructed on the sloping east edge of the gulch (Figure 29). The terrace is constructed of angular and subangular cobbles and small boulders piled and stacked four to six courses high (Figure 30). The terrace is primarily one course of rock wide, but there is a section at its center that retains a concentration of rock upslope. The terrace is faced along its southeast edge. The ground surface upslope (west) of the terrace has been bulldozed during sugarcane field clearing. The terrace functions to prevent soils and loose rock from falling into the gulch. The terrace appears unaltered and is in good condition. The site has been fully documented and no further work is recommended.

#### SITE 28390 (TS-10)

FORM Rock Mounds and Terrace  
 FUNCTION: Agricultural Rock Clearing  
 AGE: Historic-Era  
 DIMENSIONS: Length: 28.0m (N/S); Width: 7.0m  
 CONDITION: Good  
 SURFACE ARTIFACTS: None  
 EXCAVATION: Stratigraphic Trench 1

#### SITE 28390

Site 28390 is located approximately 70m northwest of Site 9 at an elevation of 1,560ft (476m) amsl in Waikōloa 1 Ahupua'a (see Figure 7). Vegetation in the area is guava, rose apple, coffee, *ti*, and various invasive weeds.

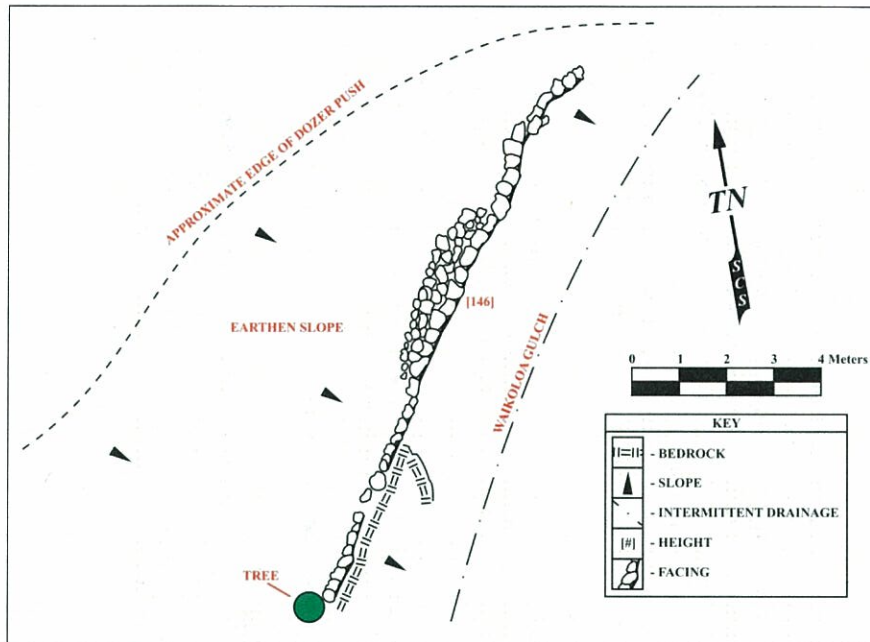


Figure 29: Site 28389 Plan View.

Site 28390 consists of a linear terrace (Fe. 1) a rectangular rock mound/terrace (Fe. 2), and a rectangular rock mound (Fe. 3) (Figure 31). The features are in a muddy swale at the base of a steep hill to the south. There is a 3.0m diameter pool of water in just southeast of the site. The level area to the north and west is old sugarcane field.

#### Feature 1

Feature 1 is a linear terrace located at the south end of the site. The terrace measures 7.0m long (northwest/southeast) by 1.0m wide, and is 0.5m in maximum height. The terrace is constructed of angular and subangular cobbles and small boulders. The rocks are primarily placed in a single alignment with some stacking and rough facing on the west end of the terrace. There is a concentration of rocks along the south side of the west end of the terrace. The terrace appears to be constructed to retain soil from the raised level area to the south. This level area might be a path to the waterhole to the southeast. The terrace has been badly disturbed by pigs and is in poor condition.

#### Feature 2

Feature 2 is located on a rock outcrop at the north end of the site and is a rock-clearing mound constructed with the formal appearance of a three-sided terrace. The feature is 5.5m long (N/S) by 5.4m wide, and is 0.73m in maximum height. The feature is constructed of large cobbles and small boulders stacked as a perimeter around an interior fill of small cobbles to small boulders (Figure 32). The top surface of the mound is uneven due to settling, but might have once been a level paving. The north and west sides of the feature are stacked five to six courses high and are faced (Figure 33). Feature 2 is slightly altered by weathering and is in good condition. A 1.0 by 2.0m test-unit was excavated at Feature 2 to determine timing and function.

#### Test-Unit 1 (TU-1)

A 1.0 by .20m test-unit was excavated though the west side of Feature 2 at Site 28390 (see Figure 31). TU-1 was excavated as an architectural layer and one natural stratigraphic layer (Figure 34). The unit was excavated to a maximum of 100cmbs, and terminated on a culturally sterile dark yellowish brown sediment.



Figure 30: Photograph of Site 28389 Terrace Facing Northeast.





Figure 32: Photograph of Site 28390, Feature 2, View to East.

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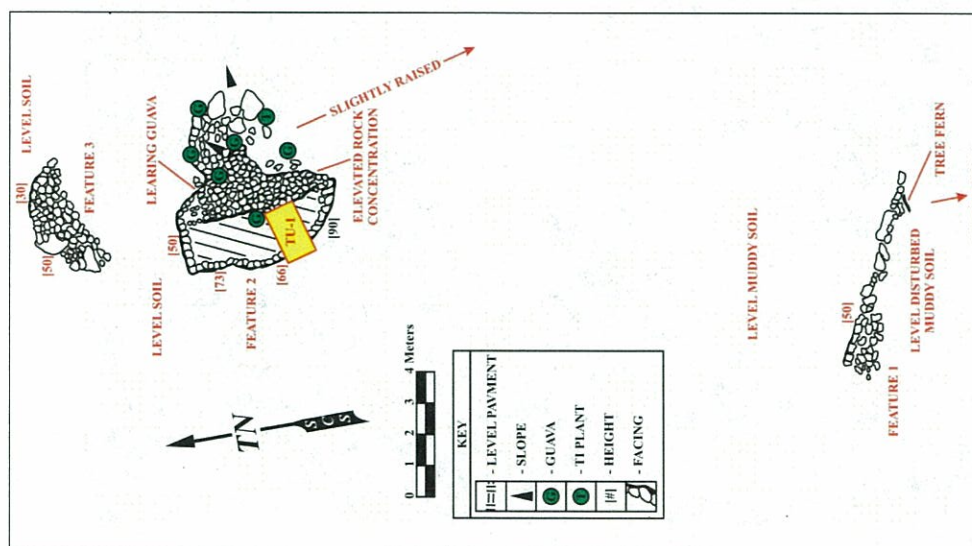


Figure 31: Site 28390 Plan View.

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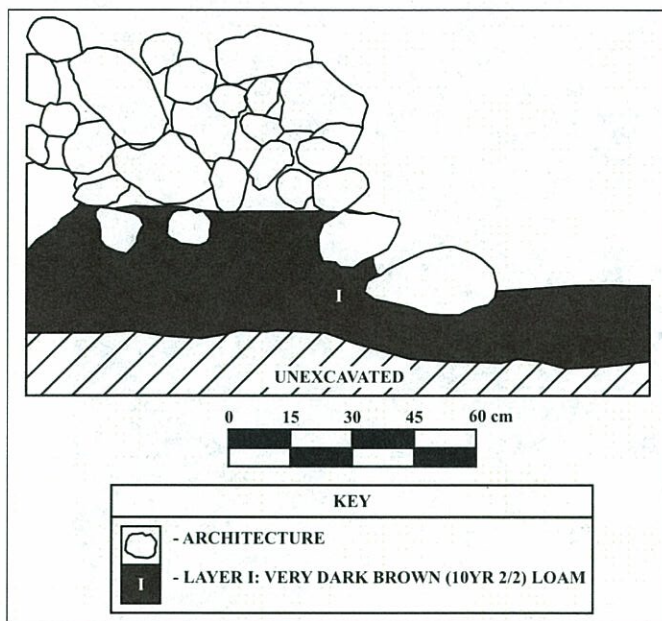


Figure 34: Site 28390, Feature 2, TU-1 South Profile.



Figure 33: Photograph of Site 28390, Feature 2 Facing, View to North.



The Architectural Layer (0-60cmbs) was piled and stacked angular and subangular cobbles to small boulders with small amounts of organic detritus and no roots. No internal structure or subsurface features were encountered. The base of the platform architecture extended 15cm below the top of Layer I. No artifacts were recovered from the Architectural Layer.

Layer I (60-100cmbs) was loose very dark brown (10YR2/2) very fine to coarse loam with peds, 20% basalt pebbles to small boulders, and a few small Christmas berry roots. A small amount (1.1g) of burnt wood fragments, were recovered from the top surface of Layer I. No other cultural material was recovered from Layer I. TU-1 was terminated on the top of a dark yellowish brown silty sediment.

#### Feature 3

Feature 3 is a rectangular rock clearing mound located 2.5m north of Feature 2. The rock mound is 4.0m long (northeast/southwest) by 1.8m wide and is 0.5m in maximum height. It is constructed of piled and stacked angular and subangular cobbles and small boulders. The majority of the feature is piled with a small section of stacked and faced perimeter on the north side. Feature 3 appears to be unaltered and is in good condition.

#### Site 28390 Summary

Site 28390 is an area at the edge of sugarcane field where rock cleared from the field was placed. The linear terrace (Feature 1) likely marks the edge of a small pathway to a waterhole. The rock clearing mounds are a type commonly found on Historic-era sugarcane and ranch lands (Escott 2004, Wolforth and Chalmer 2007 draft). Site 28390 has been fully documented and no further work is recommended.

#### SITE 28391 (TS-11)

|                    |  |
|--------------------|--|
| FORM               | Rockshelter                                      |
| FUNCTION:          | Temporary Habitation                             |
| AGE:               | Pre-Contact Era                                  |
| DIMENSIONS:        | Length: 5.5m (NW/SE); Width: 5.0m; Height: 2.68m |
| CONDITION:         | Good   |
| SURFACE ARTIFACTS: | None   |
| EXCAVATION:        | Test-Unit 1                                      |

#### SITE 28391

Site 28391 is located along the east edge of the Waikōloa Gulch at an elevation of 1,415ft (431m) amsl in Wa'ale'a 2 Ahupua'a (see Figure 7). Vegetation in the area is rose apple. The rockshelter opening is approximately 5.5m wide and faces to the southeast (Figure 35). There are two linear terraces (an exterior and interior) within the rockshelter. The exterior terrace is 3.6m long (northeast/southwest) by 0.3m to 0.5m wide, and is 0.2m in height. The interior terrace is 1.1m long (northeast/southwest) by 0.2m wide, and is 0.32m in maximum height. Both terraces are constructed of a single course of angular and subangular basalt cobbles. The interior terrace is roughly faced. The rockshelter appears to be unaltered and is in good condition. A 0.5m by 1.0m test-unit was excavated in the rockshelter to determine timing and function.

#### Test-Unit 1 (TU-1)

A 0.5 by 1.0m test-unit (TU-1) was excavated near the entrance to the rockshelter (see Figure 35). TU-1 was excavated as two natural stratigraphic layers, was excavated to a maximum of 40cmbs, and terminated on a culturally sterile sediment and decomposing bedrock (Figure 36).

Layer I (0-21cmbs) was loose very dark brown (10YR2/2) very fine silt loam with 5% pebbles and small cobbles, and less than 1% very fine roots. A total of 34.5g of small charred wood fragments, a fragment (2.2g) of burnt *kukui* nut, a secondary basalt flake and an interior flake of volcanic-glass were recovered from Layer I. The base of Layer I was clear and slightly wavy.

Layer II (21-40cmbs) was loose dark brown (10YR3/3) silt with 10% small to medium-size cobbles and less than 1% roots. A small amount of charred wood fragments (7.9g) and a small fragment (0.2g) of burnt *kukui* nut were recovered from Layer. TU-1 was terminated at the top of decaying bedrock and fine dark yellowish brown silt sediment.

A radio carbon sample (SCSRC631) from Layer I and a sample (SCSRC632) from Layer II returned date 2-sigma date ranges of 1800-1960AD (72% probability) and 1720-1820AD respectively (Figure 37 and 38). It seems likely that based on the dates and artifact assemblage that the rockshelter was used from the late pre-Contact era to the time of contact with Europeans.

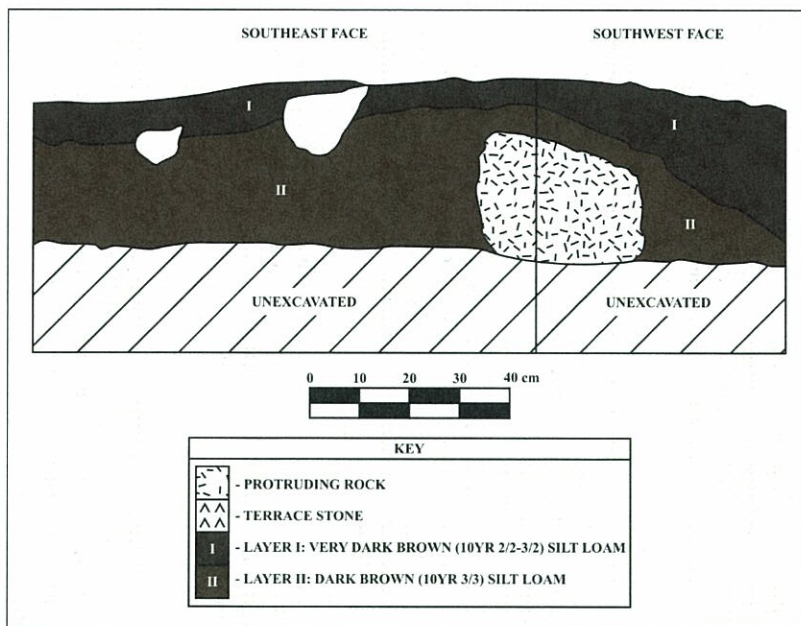


Figure 36: Site 28391, TU-1 South Profile.

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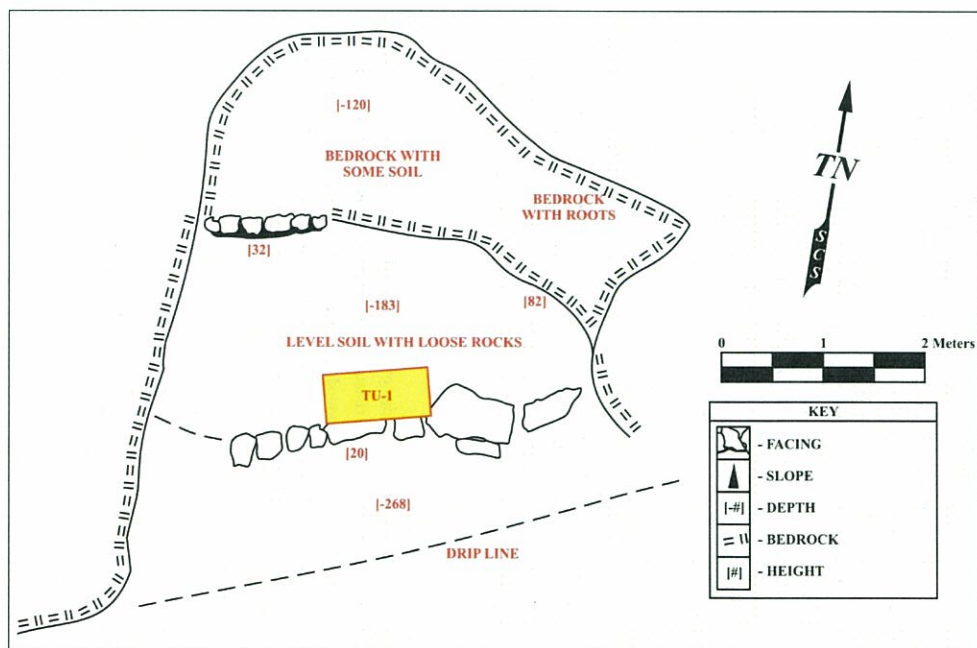


Figure 35: Site 28391 Plan View.

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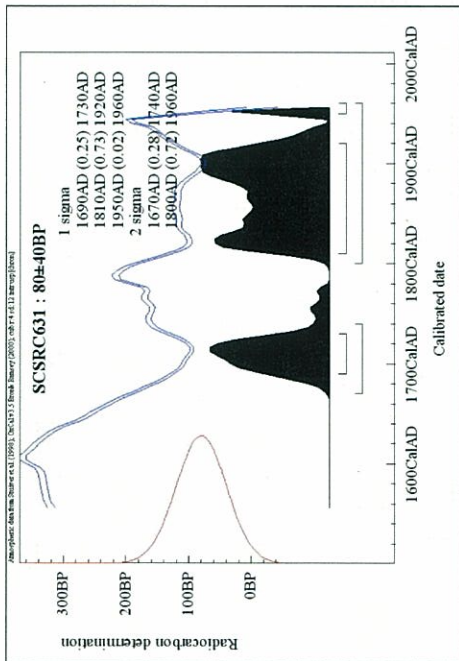


Figure 37: Site 28391, TU-1, Layer I Radiocarbon Dating Results.

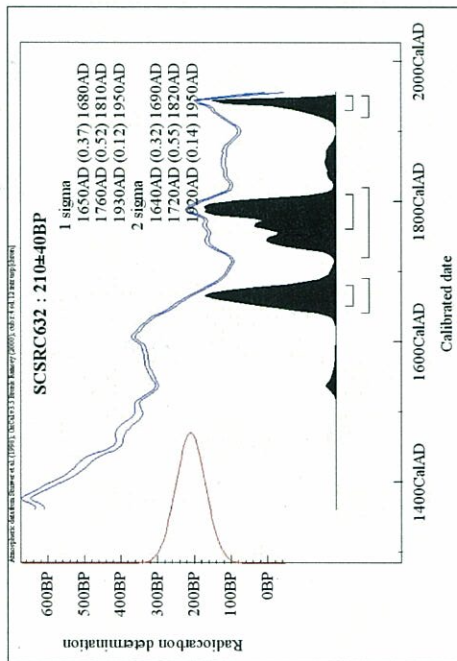


Figure 38: Site 28391, TU-1, Layer II Radiocarbon Dating Results.

#### Site 28391 Summary

Based on the cultural material and the radiocarbon dates recovered from TU-1, it is likely that the rockshelter was used as a limited temporary habitation and/or rest/stop by travelers passing through the area during the late pre-Contact era. Site 28391 has been fully documented and no further work is recommended.

#### SITE 28392 (TS-12)

FORM: Rockshelter  
FUNCTION: Temporary Habitation  
AGE: Pre-Contact Era  
DIMENSIONS: Length: 5.75m (N/S); Width: 4.25m; Height: 1.9m  
CONDITION: Fair  
SURFACE ARTIFACTS: None  
EXCAVATION: Test-Unit 1

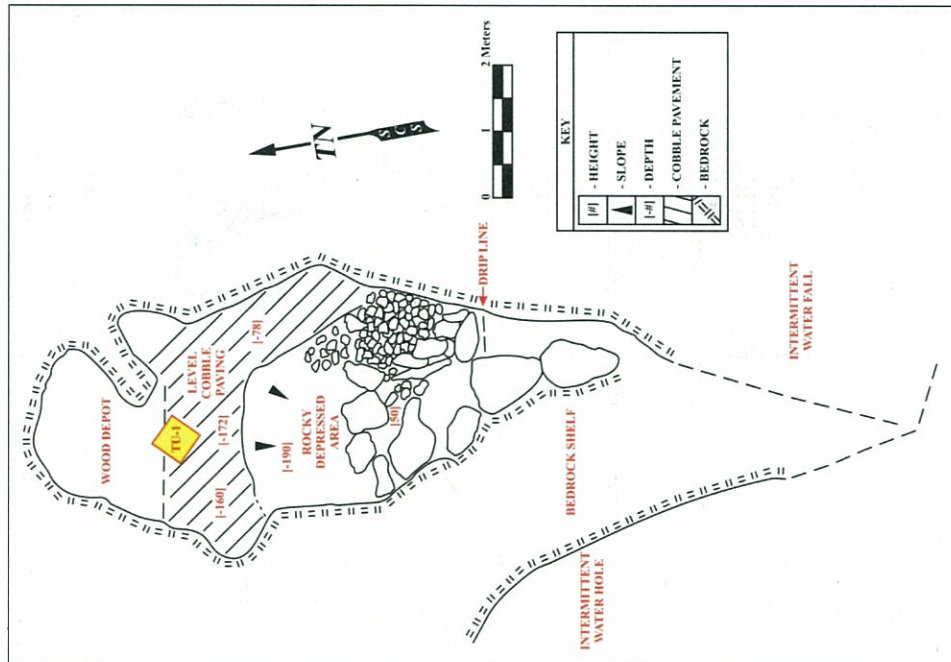
#### SITE 28392

Site 28392 is located along the northeast edge of the Waikōloa Gulch at an elevation of 1,390ft (424m) amsl in Wai'ale'ale 2 Ahupua'a (see Figure 7). Vegetation in the area is rose apple, coffee, and various ferns. The rockshelter is just above the floor of the gulch (Figure 39). Water coming down the gulch passes over a two meter high waterfall just to the east, and collects in a basin at the base of the shelter opening. The rockshelter opening is approximately 2.0m wide and faces to the south. There is a concentration of cobbles and small boulders just inside the opening that retains a level surface within the rockshelter. It appears that the rock concentration is manmade and not simply natural. There is also a concentration of cobbles near the back of the rock shelter and a concentration of sticks and small limbs at the very back of the shelter. It is possible that the wood was pushed into the shelter when the gulch overflowed during heavy rainfall. A 0.5 by 0.5m test-unit was excavated in the rockshelter to determine the timing and function of Site 28392.

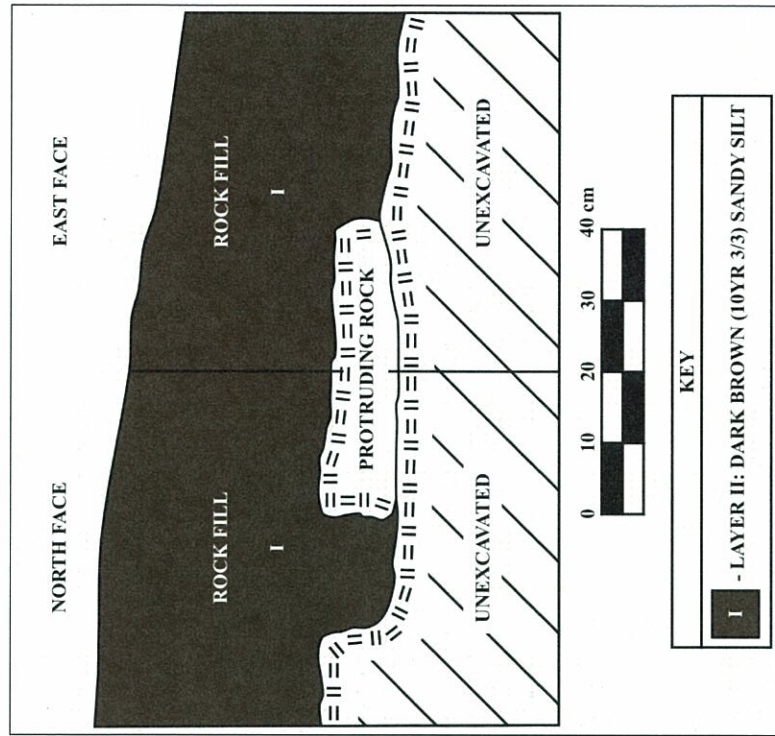
#### Test-Unit 1 (TU-1)

A 0.5 by 0.5m test-unit (TU-1) was excavated at the center of the rockshelter (see Figure 39). TU-1 was excavated as one natural stratigraphic layer, was excavated to a maximum of 47cmbs, and terminated on decomposing bedrock (Figure 40).





**Figure 39: Site 28392 Plan View.**



**Figure 40: Site 28392, TU-1 North and East Profiles.**



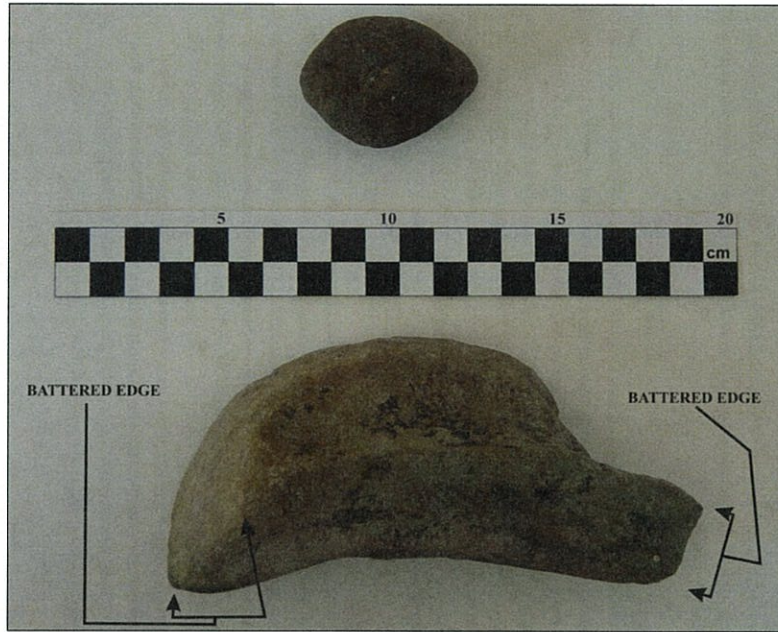


Figure 41: Top: Site 28392, TU-1, Layer I (0-47cmbs): Possible Basalt Slingstone. Bottom: Site 28392, Surface: Basalt Hammerstone Showing Battered Edges.

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Layer I (0-47cmbs) was loose dark brown (10YR3/3) very fine to fine sandy silt with 30% pebbles to medium-size cobbles and no roots. A possible basalt hammerstone and a possible sling stone were recovered from Layer I (Figure 41). A very small amount of tiny charred wood fragments (0.2g) was recovered from Layer. TU-1 was terminated at the top of decaying bedrock and fine dark yellowish brown silt sediment.

It is possible that the rockshelter was used as a limited temporary habitation and/or rest/stop by travelers passing through the area during the pre-Contact era. The rockshelter appears have been altered by flooding and is in fair condition. Site 28392 has been fully documented and no further work is recommended.

#### SITE 28393 (TS-13)

|                    |                                   |
|--------------------|-----------------------------------|
| FORM               | Rock Walls                        |
| FUNCTION:          | Boundary                          |
| AGE:               | Historic-Era                      |
| DIMENSIONS:        | Length: 56.0m (N/S); Width: 28.0m |
| CONDITION:         | Fair                              |
| SURFACE ARTIFACTS: | None                              |
| EXCAVATION:        | None                              |

#### SITE 28393

Site 28393 is located approximately forty meters west of Site 28393 along the Waikōloa Gulch at an elevation of 1,390ft (424m) amsl in Waikōloa 1 Ahupua'a (see Figure 7). Vegetation in the area is *kukui*, rose apple, coffee, *ti*, guava, and various ferns. The site consists of three rock walls (Fe. 1, 3, and 4) and rock concentration (Fe. 2) (Figure 42). The features are located on both the north and south sides of the gulch. The north side of the gulch is a narrow and steep slope, and the south side is wider and level.

#### Feature 1

Feature 1 is a rock wall segment located on the south side of the site. The wall is situated from the base of a hill on the south to the edge of the Waikōloa Gulch on the north. The wall is roughly 19.0m long (NW/SE) by 0.8m wide, and is 1.55m in maximum height. The wall is constructed of stacked angular and subangular cobbles and small boulders. It is bi-faced and core-filled. The construction style is typical of Historic-era ranch and sugarcane plantation walls.

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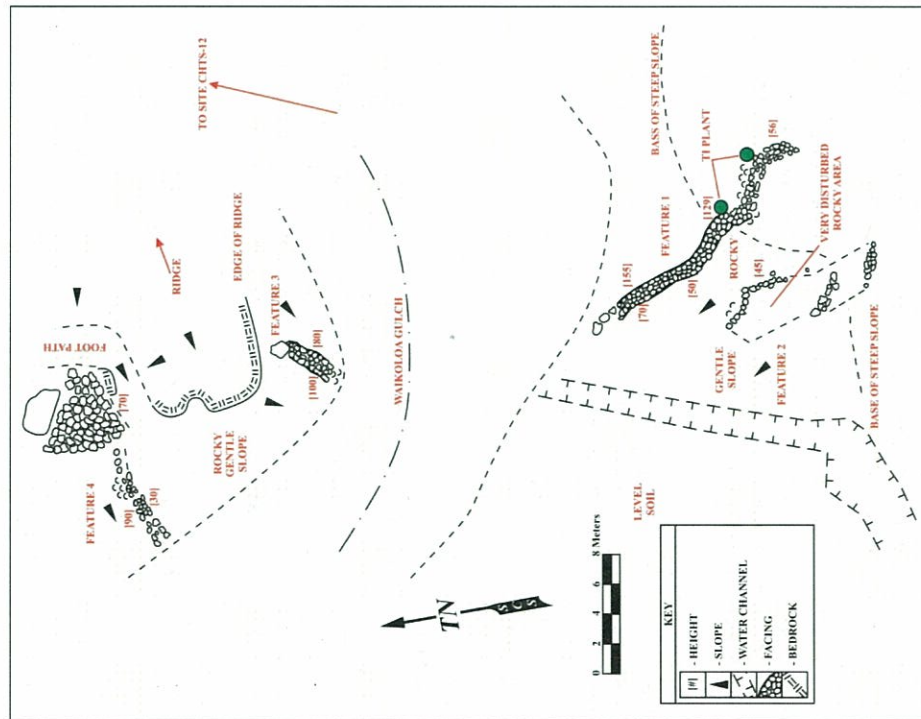


Figure 42: Site 28393 Plan View.

The wall might have extended across the gulch and connected to the Feature 3 wall, but it does not do so currently. The northern terminus is collapsed. The wall has been altered by weathering and pigs, and is in fair condition.

#### Feature 2

Feature 2 is a rock concentration located three meters west of Feature 1. The rock concentration is roughly 8.0m long (NW/SE) by 3.4m wide, and is 0.45m in maximum height. The rock concentration is constructed of angular and subangular cobbles and small boulders loosely piled on the ground surface. There is no stacking or facing evident in feature construction. The concentration is the result of rock clearing on the level soil bank of the Waikōloa Gulch. Feature 2 has been altered by pigs and is in poor condition.

#### Feature 3

Feature 3 is a rock wall segment located on the north side of the site. The wall is situated from the base of a bedrock ridge on the north to the edge of the Waikōloa Gulch on the south. The wall is roughly 4.0m long (NE/SW) by 0.8m wide, and is 1.0m in maximum height. The wall is constructed of stacked angular and subangular cobbles and small boulders. It is bi-faced and core-filled. The construction style is typical of Historic-era ranch and sugarcane plantation walls. The wall might have extended across the gulch and connected to the Feature 1 wall, but it does not do so currently. The wall has been altered by weathering and pigs, and is in fair condition.

#### Feature 4

Feature 4 is a collapsed rock wall segment located on the north side of the site. The wall is situated from the base of a hill on the south to the edge of the Waikōloa Gulch on the north. The collapsed wall is roughly 13.0m long (NE/SW) by 5.8m wide, and is 0.9m in maximum height. The wall is constructed of stacked angular and subangular cobbles and small boulders. It is bi-faced and core-filled. The construction style is typical of Historic-era ranch and sugarcane plantation walls. Both ends of the wall are collapsed. There is a pile of rock where the wall collapsed on the east end. Feature 4 appears to be the edge of a footpath leading to the gulch bottom from the sugarcane field above the north side of the gulch. Feature 4 has been altered by weathering and pigs, and is in poor condition.



#### Site 28393 Summary

Site 28393 is part of the Historic-era sugarcane plantation. Feature 1 and Feature 3 walls were likely constructed to mark the boundary between two fields. The remaining wall (Fe. 4) is the edge of a footpath leading to the gulch bottom. Feature 2 is a rock concentration that resulted from clearing loose rock from the level south bank of the gulch. Site 28393 has been fully documented and no further work is recommended.

#### SITE 28394 (TS-14)

|                    |  |
|--------------------|--|
| FORM               | Rockshelter                                      |
| FUNCTION:          | Temporary Habitation                             |
| AGE:               | Pre-Contact Era                                  |
| DIMENSIONS:        | Length: 3.5m (NE/SW); Width: 3.5m; Height: 2.17m |
| CONDITION:         | Good   |
| SURFACE ARTIFACTS: | None   |
| EXCAVATION:        | None   |

#### SITE 28394

Site 28394 is located along the northeast edge of the Waikōloa Gulch at an elevation of 1,420ft (433m) amsl in Wai'ale'ale 2 Ahupua'a (see Figure 7). Vegetation in the area is rose apple, banyan, coffee, and various ferns. The site is a shallow rockshelter above the floor of the gulch (Figure 43). The rockshelter is open toward the southwest and is accessed using a step one meter above the ground surface. The step is 1.4m long (NW/SE) by 0.5m wide, and is constructed of a single course of angular large cobbles placed on a ledge. There is a 3.0m long (NE/SW) by 3.0m wide area of level soil and small cobbles to the east of the step. This small area is sheltered and might have been used as a rest area and/or a very limited temporary habitation by travelers passing through the area. There is also a footpath that leads to the sugarcane field above the gulch. The rockshelter is unaltered and is in good condition. Site 28394 has been fully documented and no further work is recommended.

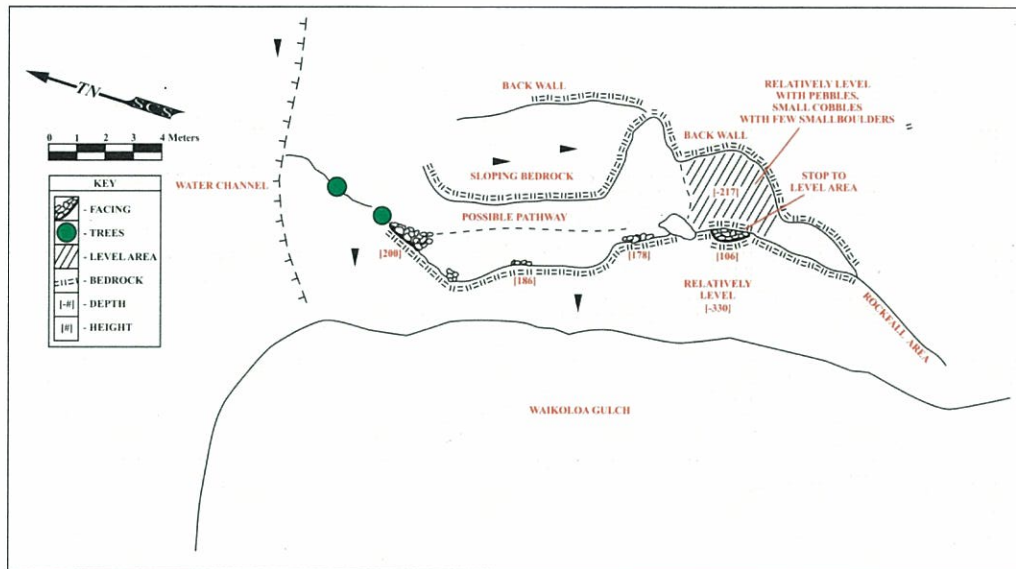


Figure 43: Site 28394 Plan View.

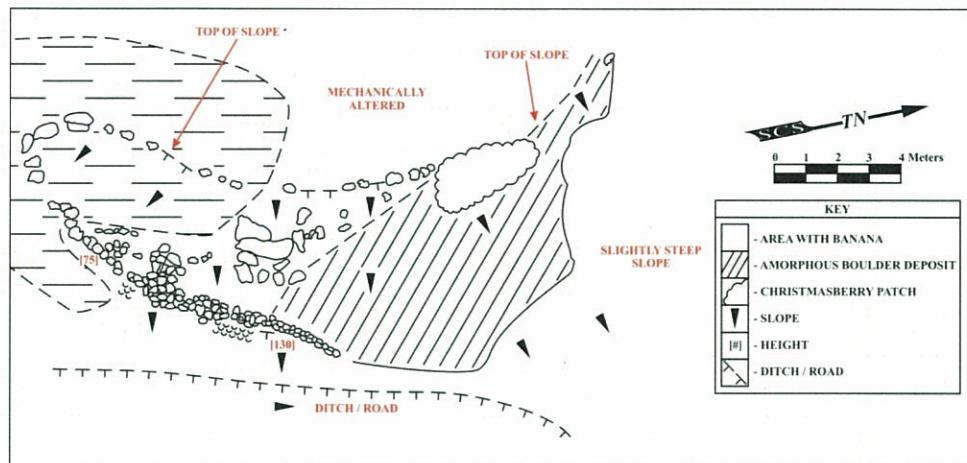


Figure 44: Site 28395 Plan View.

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#### SITE 28395 (TS-15)

FORM: Rock Concentration  
 FUNCTION: Agricultural Rock Clearing  
 AGE: Historic-Era  
 DIMENSIONS: Length: 19.0m (N/S); Width: 10.0m  
 CONDITION: Good  
 SURFACE ARTIFACTS: None  
 EXCAVATION: None

#### SITE 28395

Site 28395 is located at an elevation of 1,240ft (378m) amsl in Kapulena Ahupua'a (see Figure 7). Vegetation in the area is Christmas berry, banana, ironwood, and various ferns. The site is a concentration of rocks along the west edge of a dirt road. The rock concentration consists of loosely piled cobbles and small boulders (Figure 44). The rocks were removed from the surrounding sugarcane fields and were placed along the edge of the road. It is possible that the rocks were pushed with a bulldozer. The rock concentration appears to be unaltered and is in good condition. Site 15 has been fully documented and no further work is recommended.

#### SITE 28396 (TS-16)

FORM: Terrace  
 FUNCTION: Rock Clearing  
 AGE: Historic-Era  
 DIMENSIONS: Length: 10.0m (NW/SE); Width: 9.0m; Height: 1.5m (max)  
 CONDITION: Good  
 SURFACE ARTIFACTS: Glass Jar  
 EXCAVATION: Test Unit 1 and Test Unit 2

#### SITE 28396

Site 28396 is located along the top of a *mauka/makai* (NW/SE) oriented ridgeline at an elevation of 1,418ft (432m) amsl in Kapulena Ahupua'a (see Figure 7). The level area surrounding the ridgeline is old sugarcane fields dominated by ironwood. There are several Christmas berry and guava trees, and grass growing on the ridgeline. The site is a two-sided terrace built along the northwest edge of the ridgeline (Figure 45).

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The terrace is constructed of an outer perimeter of large cobbles and small boulders with a level paving of cobbles and a few small boulders on its interior. The northwest and northeast sides of the terrace is stacked and faced. There are two tiers in the terrace. The upper tier is located on the southwest half of the terrace and is approximately 0.1m to 0.2m above the lower tier. There is also a pile of rock along the northeast side of the terrace. The rock slopes away from the terrace and has a level spot at its base. It is possible the level spot was used as a sitting spot by sugarcane workers. The ground surface to the south and southeast has been bulldozed and there is rock and soil pushed up along the southwest and southeast sides of the terrace. Fragments of a clear glass jar were located on the surface of the terrace. The terrace appears unaltered and is in good condition. Two 1.0m by 1.0m test-units were excavated at Site 28396 to determine its timing and function.

#### Test-Unit 1 (TU-1)

A 1.0 by 1.0m test-unit (TU-1) was excavated in the center of the terrace at Site 28396. TU-1 was excavated as an architectural layer and two natural stratigraphic layers, was excavated to a maximum of 115cmbs, and terminated on a culturally sterile sediment and decaying bedrock (Figure 46).

The Architectural Layer (0-90cmbs) was piled angular and subangular cobbles to small boulders with small amounts of organic detritus and no roots. No internal structure or subsurface features were encountered. No artifacts were recovered from the Architectural Layer.

Layer I (90-100cmbs) was loose very dark brown (10YR2/2) loam with a 20% basalt cobbles and less than 1% small roots. No cultural material was recovered from Layer I. The base of the platform architecture is within the top 5 to 10cm of Layer I.

Layer II (100-113cmbs) was compact dark yellowish brown (10YR4/6) very fine to coarse silty clay with small peds and a few very small roots. No artifacts were recovered from Layer II. TU-1 was terminated at the top of a yellowish brown fine silt and decaying bedrock.

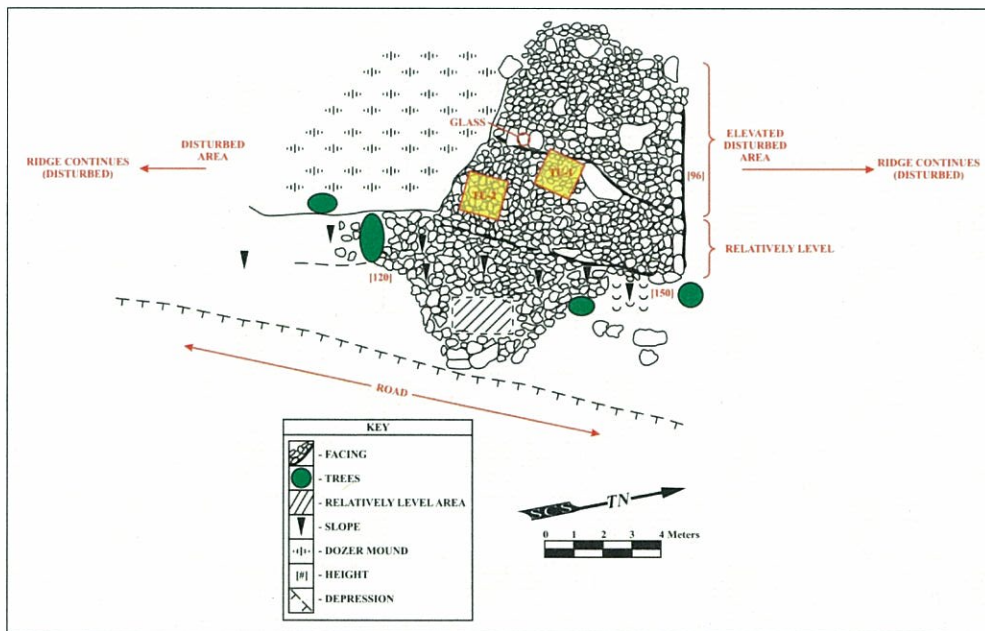


Figure 45: Site 28396 Plan View.

# Test Unit 2 (TU-2)

A 1.0 by 1.0m test-unit (TU-2) was excavated along the southeast edge of the terrace at Site 28396. TU-2 was excavated as an architectural layer and two natural stratigraphic layers, was excavated to a maximum of 130cmbs, and terminated on a culturally sterile sediment and decaying bedrock (see Figure 46).

The Architectural Layer (0-100cmbs) was piled angular and subangular cobbles to small boulders with small amounts of organic detritus and no roots. No internal structure or subsurface features were encountered. No artifacts were recovered from the Architectural Layer.

Layer I (100-120cmbs) was loose very dark brown (10YR2/2) loam with a 20% basalt cobbles and less than 1% small roots. A piece of highly corroded ferrous metal (6.7g) was recovered from Layer I. The base of the platform architecture is within the top 5cm of Layer I.

Layer II (120-130cmbs) was compact dark yellowish brown (10YR4/6) very fine to coarse silty clay with small peds and a few very small roots. No artifacts were recovered from Layer II. TU-2 was terminated at the top of a yellowish brown fine silt and decaying bedrock.

# Site 28396 Summary

Site 28396 appears to be the results of sugarcane field clearing. Rock was removed from the surrounding level fields and placed on the rocky ridge. The rock was stacked in order to keep it from rolling down the slope of the ridge. Some of the rock was stacked along the slope of the ridge to prevent erosion. This type of clearing is common on Historic-era sugarcane and ranch lands (Escott 2004, Wolforth and Chalmer 2007 draft). It is possible that the terrace marks a sugarcane field boundary. Site 28396 has been fully documented and no further work is recommended.

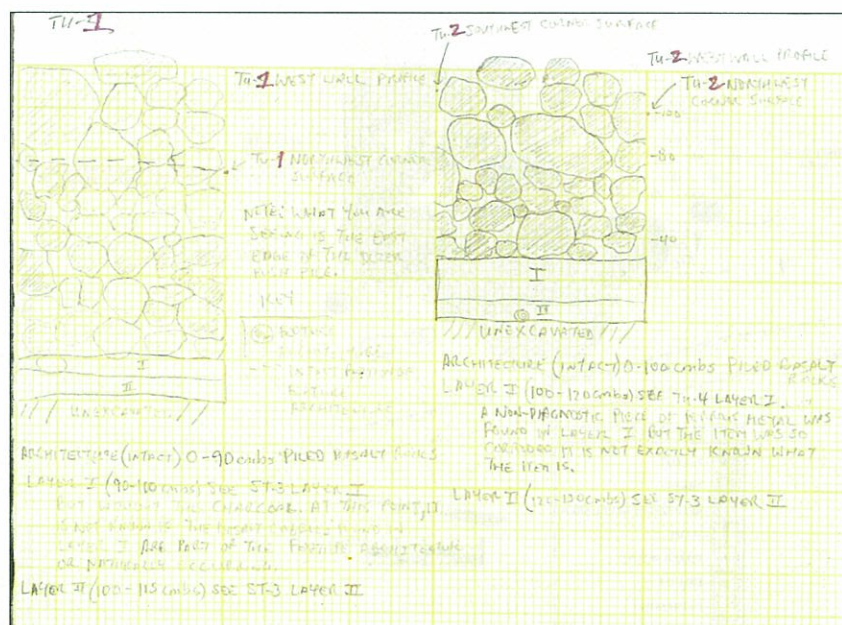


Figure 46: Site 28396, TU-1 and TU-2, West Facing Profiles.



#### SITE 28397 (TS-17)

|                    |   |
|--------------------|---|
| FORM               | Rock Mound                                      |
| FUNCTION:          | Agricultural Rock Clearing                      |
| AGE:               | Historic-Era                                    |
| DIMENSIONS:        | Length: 14.7m (E/W); Width: 10.0m; Height: 1.6m |
| CONDITION:         | Good  |
| SURFACE ARTIFACTS: | None  |
| EXCAVATION:        | None  |

#### SITE 28397

Site 28397 is located at an elevation of 1,465ft (447m) amsl in Kapulena Ahupua'a (see Figure 7). Vegetation in the area is Christmas berry, guava, *ti*, ironwood, grass, and various ferns. The site is a rock mound constructed of piled cobbles and small boulders (Figure 47). There is a small amount of stacking and facing on the *makai* (south) side of the rock mound. There is a 6.0m long (E/W) by 3.0m wide level area at the top of the rock mound. The rock mound was created by clearing rocks from the surrounding sugarcane fields. It is possible that the rocks were pushed with a bulldozer. There are bulldozer push piles on the south and west sides of the rock mound. The rock concentration appears to be unaltered and is in good condition. Site 28397 has been fully documented and no further work is recommended.

#### CONCLUSION

#### DISCUSSION

Seventeen sites comprised of twenty-eight features were recorded during the archaeological inventory survey (see Table 1; see Figure 7 and 8). Sixteen of the sites were at an elevation of between 1,200 and 1,600ft amsl, and one site was located at 1,150ft amsl. The majority of sites were clustered within or near the major gulches. Of the seventeen sites recorded, five were pre-Contact era sites, four of which were rockshelters with associated features. Artifact recovered from the rockshelters were traditional basalt and volcanic-glass tool debitage and marine shell. One additional possibly pre-Contact era site (Site 28385) is a multi-tier platform that might bet the remains of the Pukiohi'aka *heiau* once located 1400 feet above sea level in Kapulena Ahupua'a (Stokes 1919). Radiocarbon dates returned for two of the sites point to late pre-Contact to early post-Contact era use.

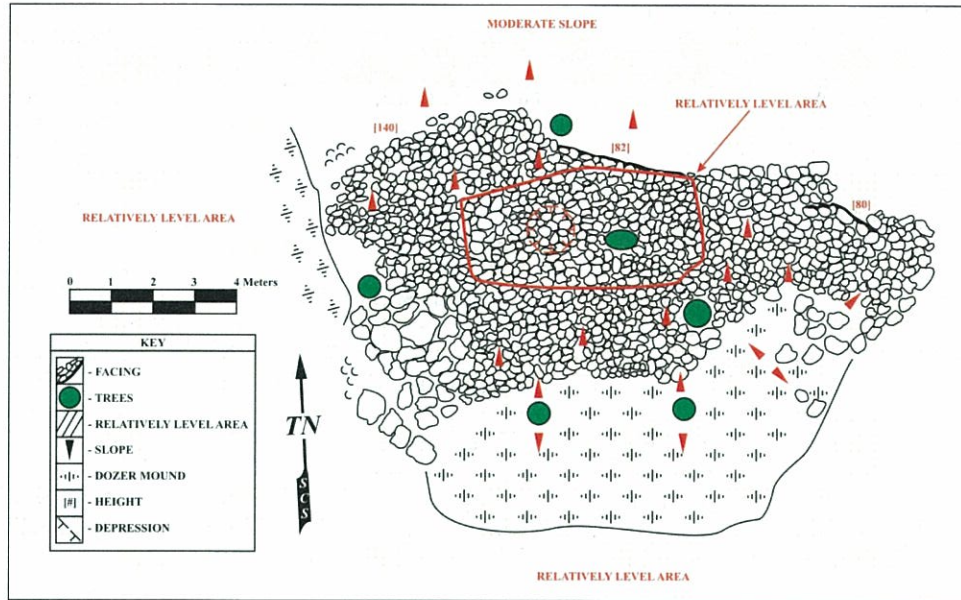


Figure 47: Site 28397 Plan View.

**Table 2: Site Significance and Recommended Treatments.**

| Site # | Site Type                | Age          | Site Function         | Significance Criteria | Recommended Treatment |
|--------|--------------------------|--------------|-----------------------|-----------------------|-----------------------|
| 28381  | Rock Wall                | Historic Era | Boundary/Ag Clearing  | D                     | No Further Work       |
| 28382  | Ditch                    | Historic Era | Field Drainage        | D                     | No Further Work       |
| 28383  | Rock Wall                | Historic Era | Boundary              | D                     | No Further Work       |
| 28384  | Rock Mounds              | Historic Era | Agricultural Clearing | D                     | No Further Work       |
| 28385  | Platform                 | Pre-Contact  | Poss. Heiau           | D, E                  | Data Recovery         |
| 28386  | Rock Wall & Terrace      | Historic Era | Boundary/Ag Clearing  | D                     | No Further Work       |
| 28387  | Ditch                    | Historic Era | Field Drainage        | D                     | No Further Work       |
| 28388  | Rockshelter              | Pre-Contact  | Temporary Habitation  | D                     | No Further Work       |
| 28389  | Terrace                  | Historic Era | Soil Retention        | D                     | No Further Work       |
| 28390  | Rock Mound/Terraces      | Historic Era | Agricultural Clearing | D                     | No Further Work       |
| 28391  | Rockshelter              | Pre-Contact  | Temporary Habitation  | D                     | No Further Work       |
| 28392  | Rockshelter              | Pre-Contact  | Temporary Habitation  | D                     | No Further Work       |
| 28393  | Rock Walls               | Historic Era | Boundary              | D                     | No Further Work       |
| 28394  | Rockshelter              | Pre-Contact  | Temporary Habitation  | D                     | No Further Work       |
| 28395  | Rock Mounds & Alignments | Historic Era | Agricultural Clearing | D                     | No Further Work       |
| 28396  | Terrace                  | Historic Era | Boundary/Ag Clearing  | D                     | No Further Work       |
| 28397  | Rock Mound               | Historic Era | Agricultural Clearing | D                     | No Further Work       |

The remaining twelve sites identified on the project are the remains of Historic era sugarcane agriculture. Component features include seven rock mounds and three rock concentrations created by during field clearing activities; five terraces forming field boundaries and likely the result of field clearing activities; four rock walls forming field boundaries; and three earthen drainage ditches.

#### **SIGNIFICANCE ASSESSMENTS**

Sites identified during this project were assessed for their significance as outlined in Hawai'i Administrative Rules §13-275-6. To be assessed as significant a site must be characterized by one or more of the following five criteria:

- (A) It must be associated with events that have made a significant contribution to the broad patterns of our history, or be considered a traditional cultural property.
- (B) It must be associated with the lives of persons significant in the past.
- (C) It must embody distinctive characteristics of a type, period, or method of construction, or represent a significant and distinguishable entity whose components may lack individual distinction.
- (D) It must have yielded or may be likely to yield, information important in prehistory or history.
- (E) Have important value to native Hawaiian people or other ethnicities in the state, due to associations with cultural practices and traditional beliefs that were, or still are, carried out.

All of the sites documented in this report were evaluated for their significance regarding prehistory (Table 2).



## RECOMMENDATIONS

No further work is recommended for 16 of the 17 sites recorded during the current archaeological inventory survey. Information recorded during the current study has adequately ascertained the timing and function of all features at all 16 sites. The sites are associated with Historic sugarcane field clearing and pre-Contact temporary habitation. Full documentation of the sites and their features are contained in this report and include historical information, maps, figures, and descriptions.

Data recovery is recommended at the multi-tier platform at Site 28385 to further refine the temporal association of the feature and to determine the platform's function. The platform has been badly impacted by sugarcane field clearing, only partially remains, and is in poor condition. Only a small amount of charcoal was recovered from one test-unit during the archaeological inventory survey subsurface testing. While a single radiocarbon sample returned a possible late pre-Contact Era to early post-Contact Era date range, additional radiocarbon samples should be obtained. It is possible, based on a small amount of surface artifacts, that the platform is an historic sugarcane structure built for loading or processing cane. However, the amount of labor expended to build the structure is uncommonly great compared to sugarcane features documented at other sugarcane plantation sites. Data recovery is recommended at Site 28385 to answer these remaining research questions.

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Appendix *D*

{ Cultural Impact Assessment }

**A CULTURAL IMPACT ASSESSMENT OF  
1,738.377 ACRES IN MALANAHAE, KAPOAULA, KAPULENA,  
WAI'ALE'ALE 1<sup>ST</sup> AND 2<sup>ND</sup>, WAIKŌLOA 1<sup>ST</sup> AND 2<sup>ND</sup>, NIUPUKA, AND  
HANAPAI AHUPUA'A, HAMAKUA DISTRICT, ISLAND OF HAWAII  
[TMK: (3) 4-7-05:01, 02 and 03, and (3) 4-7-06: 01, 05, 06, 07, 10, 18, and 20]**

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Draft Report  
May 2010

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## INTRODUCTION

At the request of PBR Hawaii and Associates, Scientific Consultant Services, Inc. (SCS) conducted a Cultural Impact Assessment, of a 1,738.377-acre parcel [TMK: (3) 4-7-05-01, 02 and 03, and (3) 4-7-06: 01, 05, 06, 07, 10, 18, and 20 ] in the *ahupua'a* of Malanahae, Kapoaula, Kapulena, Waialeale 1<sup>st</sup> and 2<sup>nd</sup>, Waikōloa 1<sup>st</sup> and 2<sup>nd</sup>, Niupuka, and Hanalei, *māhala* of Kapulena in Hāmākua District, Hawai'i Island (Figure 1, 2, 3, and 4). The parcel extends from 960ft (293m) to 2,160ft (659m) above mean sea level (amsl). The parcel is being considered for lease by the County of Hawai'i.

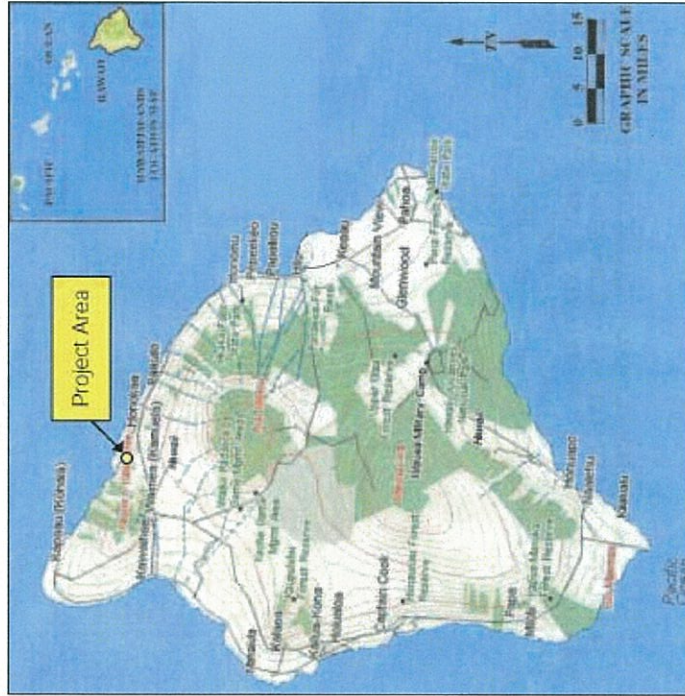


Figure 1: Hawai'i Island Map Showing Project Area Location.

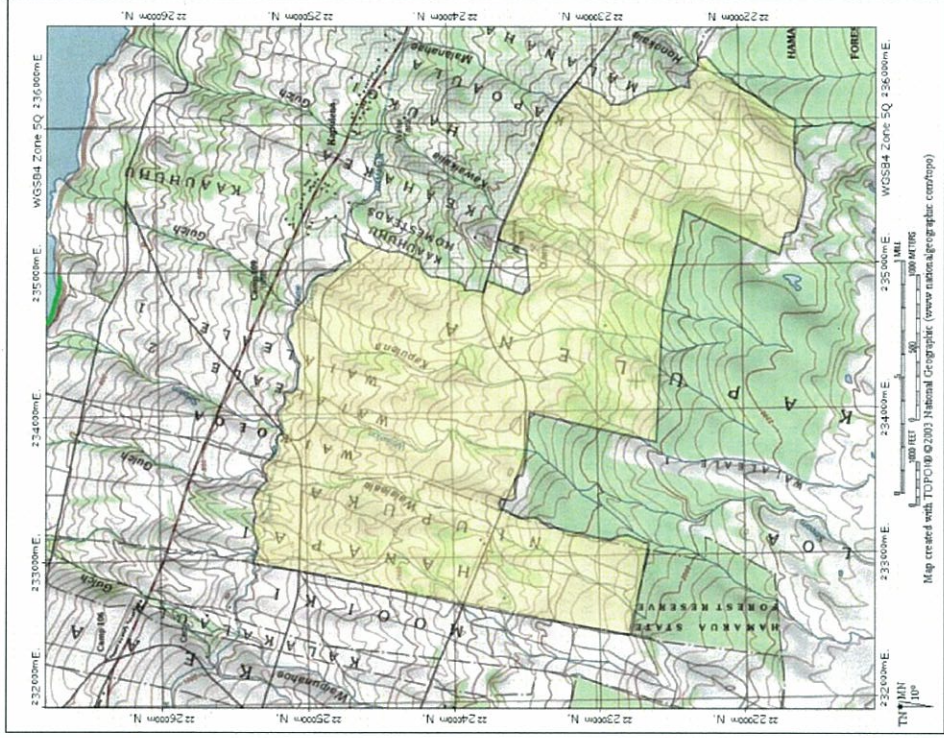


Figure 2: USGS TOPO Map Showing Project Area Location (Shaded Yellow).





Figure 4: Aerial Photograph of Project Area Showing Sugarcane Fields.

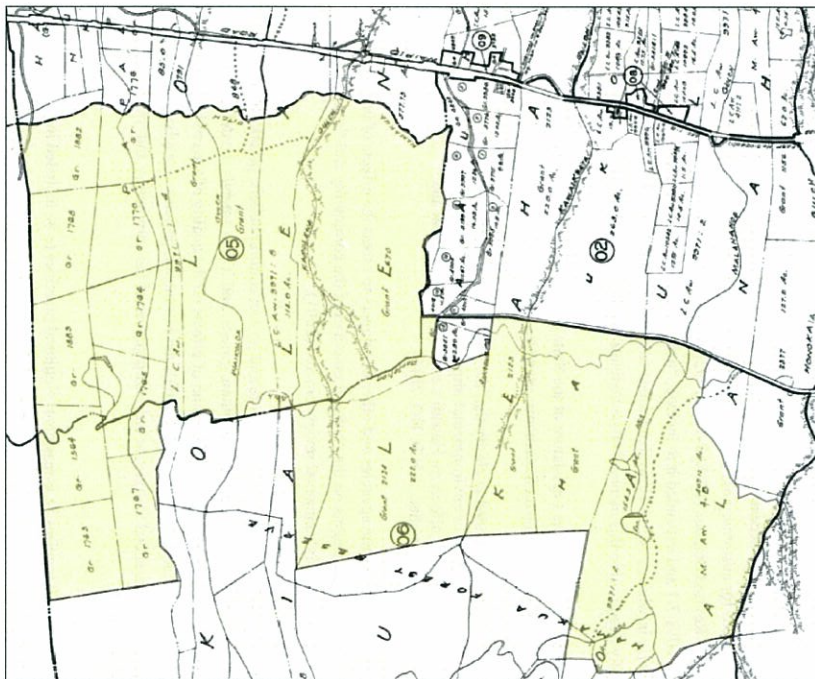


Figure 3: Location of Project Area (Shaded Yellow) on TMK: (3) 4-7 Map.



The Constitution of the State of Hawai'i clearly states the duty of the State and its agencies is to preserve, protect, and prevent interference with the traditional and customary rights of native Hawaiians. Article XII, Section 7 requires the State to "protect all rights, customarily and traditionally exercised for subsistence, cultural and religious purposes and possessed by *ahupua'a* tenants who are descendants of native Hawaiians who inhabited the Hawaiian Islands prior to 1778" (2000). In spite of the establishment of the foreign concept of private ownership and western-style government, Kamehameha III (Kauikaeolu) preserved the peoples traditional right to subsistence. As a result in 1850, the Hawaiian Government confirmed the traditional access rights to native Hawaiian *ahupua'a* tenants to gather specific natural resources for customary uses from undeveloped private property and waterways under the Hawaiian Revised Statutes (HRS) 7-1. In 1992, the State of Hawai'i Supreme Court, reaffirmed HRS 7-1 and expanded it to include, "native Hawaiian rights...may extend beyond the *ahupua'a* in which a native Hawaiian resides where such rights have been customarily and traditionally exercised in this manner" (Pele Defense Fund v. Paty, 73 Haw.578, 1992).

Act 50, enacted by the Legislature of the State of Hawai'i (2000) with House Bill 2895, relating to Environmental Impact Statements, proposes that:

...there is a need to clarify that the preparation of environmental assessments or environmental impact statements should identify and address effects on Hawai'i's culture, and traditional and customary rights... [H.B. NO. 2895].

Act 50 requires state agencies and other developers to assess the effects of proposed land use or shore line developments on the "cultural practices of the community and State" as part of the HRS Chapter 343 environmental review process (2001).

Its purpose has broadened, "to promote and protect cultural beliefs, practices and resources of native Hawaiians [and] other ethnic groups, and it also amends the definition of 'significant effect' to be re-defined as "the sum of effects on the quality of the environment including actions that are...contrary to the State's environmental policies...or adversely affect the economic welfare, social welfare, or cultural practices of the community and State" (H.B. 2895, Act 50, 2000).

Thus, Act 50 requires an assessment of cultural practices to be included in the Environmental Assessments and the Environmental Impact Statements, and to be taken into

consideration during the planning process. The concept of geographical expansion is recognized by using, as an example, "the broad geographical area, e.g. district or *ahupua'a*" (OEQC 1997). It was decided that the process should identify 'anthropological' cultural practices, rather than 'social' cultural practices. For example, *limu* (edible seaweed) gathering would be considered an anthropological cultural practice, while a modern-day marathon would be considered a social cultural practice.

According to the Guidelines for Assessing Cultural Impacts established by the Hawaii State Office of Environmental Quality Control (OEQC 1997): The types of cultural practices and beliefs subject to assessment may include subsistence, commercial, residential, agricultural, access-related, recreational, and religious and spiritual customs. The types of cultural resources subject to assessment may include traditional cultural properties or other types of historic sites, both manmade and natural, which support such cultural beliefs.

This Cultural Impact Assessment involves evaluating the probability of impacts on identified cultural resources, including values, rights, beliefs, objects, records, properties, and stories occurring within the project area and its vicinity (H.B. 2895, Act 50, 2000).

#### METHODOLOGY

This Cultural Impact Assessment was prepared in accordance with the methodology and content protocol provided in the Guidelines for Assessing Cultural Impacts (OEQC 1997). In outlining the "Cultural Impact Assessment Methodology", the OEQC state: "...information may be obtained through scoping, community meetings, ethnographic interviews and oral histories... (1997).

The report contains archival and documentary research, as well as communication with organizations having knowledge of the project area, its cultural resources, and its practices and beliefs. This Cultural Impact Assessment was prepared in accordance with the methodology and content protocol provided in the Guidelines for Assessing Cultural Impacts (OEQC 1997). The assessment concerning cultural impacts should address, but not be limited to, the following matters:

- (1) a discussion of the methods applied and results of consultation with individuals and organizations identified by the preparer as being familiar with cultural practices and

features associated with the project area, including any constraints of limitations with might have affected the quality of the information obtained;

- (2) a description of methods adopted by the preparer to identify, locate, and select the persons interviewed, including a discussion of the level of effort undertaken;
- (3) ethnographic and oral history interview procedures, including the circumstances under which the interviews were conducted, and any constraints or limitations which might have affected the quality of the information obtained;
- (4) biographical information concerning the individuals and organizations consulted, their particular expertise, and their historical and genealogical relationship to the project area, as well as information concerning the persons submitting information or interviewed, their particular knowledge and cultural expertise, if any, and their historical and genealogical relationship to the project area;
- (5) a discussion concerning historical and cultural source materials consulted, the institutions and repositories searched, and the level of effort undertaken, as well as the particular perspective of the authors, if appropriate, any opposing views, and any other relevant constraints, limitations or biases;
- (6) a discussion concerning the cultural resources, practices and beliefs identified, and for the resources and practices, their location within the broad geographical area in which the proposed action is located, as well as their direct or indirect significance or connection to the project site;
- (7) a discussion concerning the nature of the cultural practices and beliefs, and the significance of the cultural resources within the project area, affected directly or indirectly by the proposed project;
- (8) an explanation of confidential information that has been withheld from public disclosure in the assessment;
- (9) a discussion concerning any conflicting information in regard to identified cultural resources, practices and beliefs;
- (10) an analysis of the potential effect of any proposed physical alteration on cultural resources, practices or beliefs; the potential of the proposed action to isolate cultural resources, practices or beliefs from their setting; and the potential of the proposed action to introduce elements which may alter the setting in which cultural practices take place; and;
- (11) the inclusion of bibliography of references, and attached records of interviews, which were allowed to be disclosed.

Based on the inclusion of the above information, assessments of the potential effects on

cultural resources in the project area and recommendations for mitigation of these effects can be proposed.

#### ARCHIVAL RESEARCH

Archival research focused on a historical documentary study involving both published and unpublished sources. These included legendary accounts of native and early foreign writers; early historical journals and narratives; historic maps and land records such as Land Commission Awards, Royal Patent Grants, and Boundary Commission records; historic accounts, and previous archaeological project reports.

#### INTERVIEW METHODOLOGY

Interviews are conducted in accordance with Federal and State laws and guidelines. Individuals and/or groups who have knowledge of traditional practices and beliefs associated with a project area or who know of historical properties within a project area are sought for consultation. Individuals who have particular knowledge of traditions passed down from preceding generations and a personal familiarity with the project area are invited to share their relevant information. Often people are recommended for their expertise, and indeed, organizations, such as Hawaiian Civic Clubs, the Island Branch of Office of Hawaiian Affairs, historical societies, Island Trail clubs, and Planning Commissions are depended upon for their recommendations of suitable informants. These groups are invited to contribute their input, and suggest further avenues of inquiry, as well as specific individuals to interview.

If knowledgeable individuals are identified, personal interviews are sometimes taped and then transcribed. These draft transcripts are returned to each of the participants for their review and comments. After corrections are made, each individual signs a release form, making the information available for this study. When telephone interviews occur, a summary of the information is often sent for correction and approval, or dictated by the informant and then incorporated into the document. Key topics discussed with the interviewees vary from project to project, but usually include: personal association to the *ahupua'a*, land use in the project's vicinity; knowledge of traditional trails, gathering areas, water sources, religious sites; place names and their meanings; stories that were handed down concerning special places or events in the vicinity of the project area; evidence of previous activities identified while in the project vicinity.



In this case, letters briefly outlining the development plans along with maps of the project area were sent to individuals and organizations whose jurisdiction includes knowledge of the area with an invitation for consultation. Consultation was sought from Kat Markell, the Director of Native Rights, Land and Culture, Office of Hawaiian Affairs on O'ahu; Ruby McDonald, Coordinator of the Hawai'i branch of the Office of Hawaiian Affairs; the Waimea Hawaiian Civic Club; Ku Kahakalau (Hawai'i Island Burial Council); Leningrad Elarianoff (Hawai'i Island Burial Council); Dr. Billy Bergin; Keawe Vredenburg; Clement Junior Kanuha; and Reggie Lee. If cultural resources are identified based on the information received from these organizations and/or additional informants, an assessment of the potential effects on the identified cultural resources in the project area and recommendations for mitigation of these effects can be proposed. Public Notices were placed in the Ka Wai Ola OHA Newspaper, the Tribune Herald, and the Advertiser.

#### PROJECT AREA AND VICINITY

The project area is a 1,738.377-acre parcel [TMK: (3) 4-7-05:01, 02 and 03, and (3) 4-7-06: 01, 05, 06, 07, 10, 18, and 20] in the *ahupua'a* of Malanahai, Kapoaula, Kapulena, Wai'ale'ale 1<sup>st</sup> and 2<sup>nd</sup>, Waikōloa 1<sup>st</sup> and 2<sup>nd</sup>, Niupuka, and Hanapai, *mauka* of Kapulena in Hāmākua District, Hawai'i Island (Figure 1, 2, and 3). The area was wooded during the pre-Contact era. More recently, the area was under sugarcane cultivation (see Figure 4). The majority of the parcel has been altered by sugarcane agriculture.

#### CULTURAL HISTORICAL CONTEXT

##### HAWAIIAN LAND DIVISIONS AND SETTLEMENT

Initial settlement of the high Hawaiian Islands is believed to have occurred along the wetter and more fertile windward coasts where conditions were optimal for marine and terrestrial exploitation along lines followed previously in Eastern Polynesia. This exploitation involved inshore and pelagic fishing, gathering shellfish from the shore and strand, plant and animal husbandry, and the utilization of natural terrestrial flora and fauna (Kirch and Kelly 1975; Pearson *et al.* 1971; Kirch 1985). The pattern of this early settlement is thought to have consisted of widely spaced, permanent home bases that gradually expanded to form a nearly continuous zone of permanent settlement along the windward coasts as local populations grew.

There is a paucity of prehistoric information pertaining to the lands of the project area and surrounding lands (Cordy 2000:216-217). The project area is located in a traditionally sparsely populated area along the high cliffs of the Hāmākua coast. It has poor access to marine

resources and is far from the sociopolitical population center of Hilo to the east, and just outside of the Waipi'o Valley and Waimea to the west. Though a coastal trail was used to travel along the Hāmākua, much of the travel between Hilo and Waipi'o was done by sailing canoe. The project area is not at the nexus of a trail system, and Waipi'o was the cross-island travel was conducted on trails that crossed the saddle between Mauna Kea, Maun Loa, and Huālalāi (Figure 5).

#### WAIH PANA (LEGENDARY PLACES)

The *ahupua'a* of Malanahae, Kapoaula, Kapulena, Wai'ale'ale 1<sup>st</sup> and 2<sup>nd</sup>, Waikōloa 1<sup>st</sup> and 2<sup>nd</sup>, Niupuka, and Hanapai are traditional Hawaiian land divisions situated between the 200 foot high cliffs of the Hāmākua coast and the uplands. Kapoaula and Waikōloa are the longest *mauka/ma kai* and reach elevations of roughly 3,000ft amsl and 2,600ft amsl, respectively. The remaining *ahupua'a* reach an upper elevation of approximately 1,600ft amsl. Kapulena is named for the king shark of Hāmākua (Pukui *et al.* 1974:90). Waikōloa is the name of a wind, and is the name of the gulch that runs through the *ahupua'a*. Waikōloa is translated literally as "water pulling far" (Pukui *et al.* 1974:223). Wai'ale'ale is translated literally as "rippling or overflowing water" (Pukui *et al.* 1974:220). No references to the names of the four remaining *ahupua'a* are available.

#### PREHISTORIC AND HISTORIC ACCOUNTS OF KOHOLĀLELE

No published prehistoric accounts of named places within the project area are recorded by Kamakau (1992), I'i (1993), Kalakaua (1990), or Fourmader (1996). Cordy, using leaders of O'ahu and their exploits at Waipi'o, suggests that there was a ruling polity at Waipi'o that likely controlled lands of the Hāmākua (Cordy 2000: 141-142). Kamakau (1992) records that Kamehameha camped at Laupāhoehoe during his battles to conquer the Island of Hawai'i.

The Reverends William Ellis and Asa Thurston traveled through lands of the project area on their way to Waipi'o in 1823. They met a small group of people at Malanahae, and continued on to Kapulena where they preached to an assembly of about one hundred people (Ellis 2004:357). The path from Kapulena to Waipi'o was crooked and bordered on both sides by tall grass and well-cultivated "plantations."



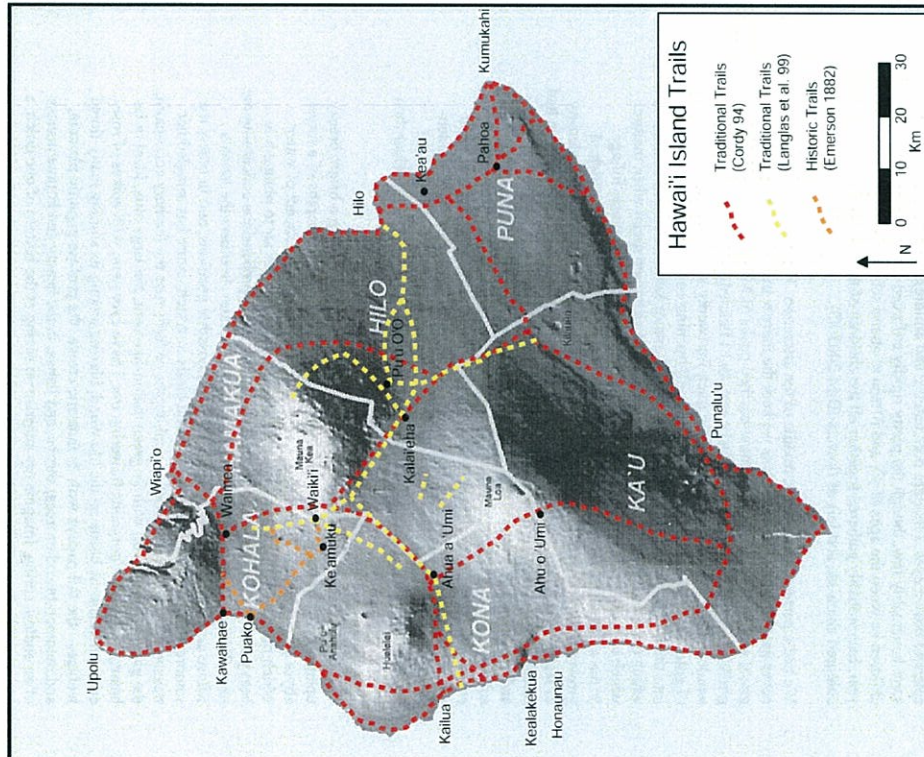


Figure 5: Hawai'i Island Trail Systems.

Ellis described the bottom of the Waipi'o Valley as

one continued garden, cultivated with taro, bananas, sugar-cane, and other productions of the island, all growing luxuriantly. Several large ponds were also seen in different directions, well stocked with excellent fish. A number of small villages, containing from twenty to fifty houses each, stood along the foot of the mountains, at unequal distances on each side, and extended up the valley till projecting cliffs obscured the view (Ellis 2004:360).

Ellis also visited several *heiau* at Waipi'o. It was said that one of the *heiau* was used by Umi a Liloa (ruled A.D 1600-1620) to make sacrifices after conquering the six *moku* of the Island of Hawai'i (Ellis 2004:366). Ellis also described Pakarana, the place of refuge (Pu'uhoia) at Waipi'o. The compound was smaller than that at Honaunau and had a small house containing the bones of Liloa. Both King Kamehameha and King Liholiho made offerings at the small house when they visited Waipi'o (Ellis 2004: 367).

Ellis and Thurston counted 256 houses in the valley and estimated the population to be about 1,325 people (Ellis 2004: 368). He also noted there were populous villages on the coast on either side of the valley. He pointed out that the Waipi'o Valley has been historically a place of socio-political power along the Hamakua coast.

In 1872, Isabella Bird traveled by horseback along the Hamakua from Onomea to the Waipi'o Valley and described the landscape she travelled through. The journey was over very rough and steep trails, and took five days. Bird noted "this is the most severe road on horses on Hawaii, and it takes a really good animal to come to Waipi'o and go back to Hilo (Bird 2007:85). The description that follows underscores the sparsely populated Hamakua area:

From Onomea to the place where we expected to find the guide, we kept going up and down the steep sides of ravines, and scrambling through torrents till we reached a deep and most picturesque gulch [Kawainui], with a primitive school-house at the bottom, and some grass-houses clustering under palms and papayas, a valley scene of endless ease and perpetual afternoon. Here we found that D.'s uncle, who was to have been our guide, could not go, because his horse was not strong enough, but her cousin volunteered his escort, and went away to catch his horse, while we tethered ours and went into the school-house.

This reminded me somewhat of the very poorest schools connected with the Edinburgh Ladies' Highland School Association, but the teacher had a remarkable paucity of clothing, and he seemed to have the charge of his baby, which, much clothed, and indeed much muffled, lay on the bench beside him. For there were



benches, and a desk, and even a blackboard and primers down in the deep wild gulch, where the music of living waters, and the thunderous roll of the Pacific, accompanied the children's tuneless voices as they sang an Hawaiian hymn. I shall remember nothing of the scholars but rows of gleaming white teeth, and splendid brown eyes. I thought both teacher and children very apathetic. There were lamentably few, though the pretty rigidly enforced law, which compels all children between the ages of six and fifteen to attend school for forty weeks of the year, had probably gathered together all the children of the district. They all wore coloured chemises and leis of flowers (Bird 2007:85).

We had a perfect day until the middle of the afternoon. The dimpling Pacific was never more than a mile from us as we kept the narrow track in the long green grass; and on our left the blunt snow-patched peaks of Mauna Kea rose from the girdle of forest, looking so delusively near that I fancied a two-hours' climb would take us to his lofty summit. The track for twenty-six miles is just in and out of gulches, from 100 to 800 feet in depth, all opening on the sea, which sweeps into them in three booming rollers. The candle-nut or kukui (aleurites triloba) tree, which on the whole predominates, has leaves of a rich deep green when mature, which contrast beautifully with the flaky silvery look of the younger foliage. Some of the shallower gulches are filled exclusively with this tree, which in growing up to the light to within 100 feet of the top, presents a mass and density of leafage quite unique, giving the gulch the appearance as if billows of green had rolled in and solidified there. Each gulch has some speciality of ferns and trees, and in such a distance as sixty miles they vary considerably with the variations of soil, climate, and temperature. But everywhere the rocks, trees, and soil are covered and crowded with the most exquisite ferns and mosses, from the great tree-fern, whose bright fronds light up the darker foliage, to the lovely maiden-hair and graceful selaginellas which are mirrored in pools of sparkling water. Everywhere, too, the great blue morning glory opened to a heaven not bluer than itself.

The descent into the gulches is always solemn. You canter along a bright breezy upland, and are suddenly arrested by a precipice, and from the depths of a forest abyss a low plash or murmur rises, or a deep bass sound, significant of water which must be crossed, and one reluctantly leaves the upper air to plunge into heavy shadow, and each experience increases one's apprehensions concerning the next. Though in some gulches the kukui preponderates, in others the lathala whose aerial roots support it in otherwise impossible positions, and in others the sombre ohia, yet there were some grand clefts in which nature has mingled her treasures impartially, and out of cool depths of ferns rose the feathery coco-palm, the glorious breadfruit, with its green melon-like fruit, the large ohia, ideal in its beauty,—the most gorgeous flowering tree I have ever seen, with spikes of rose-crimson blossoms borne on the old wood, blazing among its shining many-tinted leafage,—the tall papaya with its fantastic crown, the profuse gigantic plantain, and innumerable other trees, shrubs, and lianas, in the beauty and bounteousness of an endless spring. Imagine my surprise on seeing at the bottom of one gulch, a

grove of good-sized, dark-leaved, very handsome trees, with an abundance of smooth round green fruit upon them, and on reaching them finding that they were orange trees, their great size, far exceeding that of the largest at Valencia, having prevented me from recognizing them earlier! In another, some large shrubs with oval, shining, dark leaves, much crimped at the edges, bright green berries along the stalks, and masses of pure white flowers lying flat, like snow on evergreens, turned out to be coffee! The guava with its obuse smooth leaves, sweet white blossoms on solitary axillary stalks, and yellow fruit was universal. The novelty of the fruit, foliage, and vegetation is an intense delight to me. I should like to see how the rigid aspect of a coniferous tree, of which there is not one indigenous to the islands, would look by contrast. We passed through a long thicket of sumach, an exotic from North America, which still retains its old habit of shedding its leaves, and its grey, wintry, desolate-looking branches reminded me that there are less-favoured parts of the world, and that you are among mist, cold, murk, slush, gales, leaflessness, and all the dismal concomitants of an English winter.

It is wonderful that people should have thought of crossing these gulches on anything with four legs. Formerly, that is, within the last thirty years, the precipices could only be ascended by climbing with the utmost care, and descended by being lowered with ropes from crag to crag, and from tree to tree, when hanging on by the hands became impracticable to even the most experienced mountaineer. In this last fashion Mr. Coan and Mr. Lyons were let down to preach the gospel to the people of the then populous valleys. But within recent years, narrow tracks, allowing one horse to pass another, have been cut along the sides of these precipices, without any windings to make them easier, and only deviating enough from the perpendicular to allow of their descent by the sure-footed native-born animals. Most of them are worn by water and animals' feet, broken, rugged, jagged, with steps of rock sometimes three feet high, produced by breakage here and there. Up and down these the animals slip, jump, and scramble, some of them standing still until severely spurred, or driven by some one from behind. Then there are softer descents, slippery with damp, and perilous in heavy rains, down which they slide dexterously, gathering all their legs under them. On a few of these tracks a false step means death, but the vegetation which clothes the pali below, blinds one to the risk. I don't think anything would induce me to go up a swinging zigzag—up a terrible pali opposite to me as I write, the sides of which are quite undraped.

All the gulches for the first twenty-four miles contain running water. The great Hakalau gulch we crossed early yesterday, has a river with a smooth bed as wide as the Thames at Eton. Some have only small quiet streams, which pass gently through ferny grottoes. Others have fierce strong torrents dashing between abrupt walls of rock, among immense boulders into deep abysses, and cast themselves over precipice after precipice into the ocean. Probably, many of these are the courses of fire torrents, whose jagged masses of a-a have since been worn smooth, and channelled into holes by the action of water. A few are crossed on narrow bridges, but the majority are forded, if that quiet conventional term can be applied



to the violent flounderings by which the horses bring one through. The transparency deceives them, and however deep the water is, they always try to lift their fore feet out of it, which gives them a disagreeable rolling motion. (Mr. Brigham in his valuable monograph on the Hawaiian volcanoes quoted below, appears as much impressed with these gulches as I am.)

We lunched in one glorious valley, and Kaluna made drinking cups which held fully a pint, out of the beautiful leaves of the *Arum esculentum*. Towards afternoon turbid-looking clouds lowered over the sea, and by the time we reached the worst pali of all, the south side of Laupahoehoe, they burst on us in torrents of rain accompanied by strong wind. This terrible precipice takes one entirely by surprise. Kaluna, who rode first, disappeared so suddenly that I thought he had gone over. It is merely a dangerous broken ledge, and besides that it looks as if there were only foothold for a goat, one is dizzy by the sight of the foaming ocean immediately below, and, when we actually reached the bottom, there was only a narrow strip of shingle between the stupendous cliff and the resounding surges, which came up as if bent on destruction. The path by which we descended looked a mere thread on the side of the precipice. I don't know what the word beetling means, but if it means anything bad, I will certainly apply it to that pali.

A number of disastrous-looking native houses are clustered under some very tall palms in the open part of the gulch, but it is a most wretched situation; the roar of the surf is deafening, the scanty supply of water is brackish, there are rumours that leprosy is rife, and the people are said to be the poorest on Hawaii (Bird 2007:87-91).

We moved on in single file at a jog-trot wherever the road admitted of it, meeting mounted natives now and then, which led to a delay for the exchange of nuhous; and twice we had to turn into the thicket to avoid what here seems to be considered a danger. There are many large herds of semi-wild bullocks on the mountains, branded cattle, as distinguished from the wild or unbranded, and when they are wanted for food, a number of experienced vaccheros on strong shod horses go up, and drive forty or fifty of them down. We met such a drove bound for Hilo, with one or two men in front and others at the sides and behind, uttering loud shouts. The bullocks are nearly mad with being hunted and driven, and at times rush like a living tornado, tearing up the earth with their horns. As soon as the galloping riders are seen and the crooked-horned beasts, you retire behind a screen. There must be some tradition of some one having been knocked down and hurt, for reckless as the natives are said to be, they are careful about this, and we were warned several times by travellers whom we met, that there were "bullocks ahead." The law provides that the vaccheros shall station one of their number at the head of a gulch to give notice when cattle are to pass through.

We jogged on again till we met a native who told us that we were quite close to our destination; but there were no signs of it, for we were still on the lofty uplands, and the only prominent objects were huge headlands confronting the sea.

I got off to walk, as my mule seemed footsore, but had not gone many yards when we came suddenly to the verge of a pali, about 1,000 feet deep [Waipio], with a narrow fertile valley below, with a yet higher pali on the other side, both abutting perpendicularly on the sea. I should think the valley is not more than three miles long, and it is walled in by high inaccessible mountains. It is in fact, a gulch on a vastly enlarged scale. The prospect below us was very charming, a fertile region perfectly level, protected from the sea by sandhills, watered by a winding stream, and bright with fishponds, meadow lands, kalo patches, orange and coffee groves, figs, breadfruit, and palms. There were a number of grass-houses, and a native church with a spire, and another up the valley testified to the energy and aggressiveness of Rome (Bird 2007:94-95).

Bird's host in Waipi'o was Halemanu, a member of the legislature and the deputy sheriff. Halemanu expressed a sadness for the dwindling of the Hawaiian population. Almost fifty years earlier (*circa* 1823) there were approximately 1,300 inhabitants in the Waipi'o Valley (Bird 2007:100). At the time of Bird's visit there were no more than 200. Bird also wrote about a few of the major, traditional Hawaiian institutions established at Waipi'o, including:

the Puhonua, or place of refuge for all this part of the island. This, and the very complete one of Honaunau, on the other side of Hawaii, were the Hawaiian "Cities of Refuge." Could any tradition of the Mosaic ordinance on this subject have travelled hither? These two sanctuaries were absolutely inviolable. The gates stood perpetually open, and though the fugitive was liable to be pursued to their very threshold, he had no sooner crossed it than he was safe from king, chief, or avenger. These gates were wide, and some faced the sea, and others the mountains. Hither the murderer, the manslayer, the tabu-breaker fled, repaired to the presence of the idol, and thanked it for aiding him to reach the place of security. After a certain time the fugitives were allowed to return to their families, and none dared to injure those to whom the high gods had granted their protection.

In time of war, tall spears from which white flags were unfurled, were placed at each end of the enclosure, and until the proclamation of peace invited the vanquished to enter. These flags were fixed a short distance outside the walls, and no pursuing warrior, even in the hot flush of victory, could pursue his routed foe one foot beyond. Within was the sacred pale of pahu tabu, and anyone attempting to strike his victim there would have been put to death by the priests and their adherents. In war time the children, old people, and many of the women of the neighbouring districts, were received within the enclosure, where they awaited the issue of the conflict in security, and were safe from violence in the event of defeat. These puhonuas contain pieces of stone weighing from two to three tons, raised six feet from the ground, and the walls, narrowing gradually towards the top, are fifteen feet wide at the base and twelve feet high. They are



truly grand monuments of humanity in the midst of the barbarous institutions of heathenism, and it shows a considerable degree of enlightenment that even rebels in arms and fugitives from invading armies were safe, if they reached the sacred refuge, for the priests of Keawe knew no distinctions of party.

In dreadful contrast to this place of mercy, there were some very large heiaus (or temples) here, on whose hideous altars eighty human sacrifices are said to have been offered at one time. One of the legends told me concerning this lovely valley is, that King Umi, having vanquished the Kings of the six divisions of Hawaii, was sacrificing captives in one of these heiaus, when the voice of his god, Kuahilo, was heard from the clouds, demanding more slaughter. Fresh human blood streamed from the altars, but the insatiable demon continued to call for more, till Umi had sacrificed all the captives and all his own men but one, whom he at first refused to give up, as he was a great favourite, but Kuahilo thundered from heaven, till the favourite warrior was slain, and only the king and the sacrificing priest remained.

This valley of the "vanquished waters" abounds in legends. Some of these are about a cruel monster, King Hooke, who lived here, and whose memory, so far as he is remembered, is much execrated. It is told of him that if a man were said to have a handsome head he sent some of his warriors to behead him, and then hacked and otherwise disfigured the face for a diversion. On one occasion he ordered a man's arm to be cut off and brought to him, simply because it was said to be more beautifully tattooed than his own. It is fifty-four years since the last human sacrifice was exposed on the Waipio altars, but there are several old people here who must have been at least thirty when Hawaii threw off idolatry for ever (Bird 2007:100-101).

Bird also described the sugar plantation at Kaiwiki, east of the project area. It was one of the first sugar mills established on the Island of Hawai'i. The Hamakua Mill Company and the Pacific Sugar Mill Company had not yet been established at the time of her journey. Those two companies were established in 1877 and 1878, respectively. The Pacific Sugar Mill Company was located at Kukuihaele, and the Kaiwiki Mill Company was located further east at 'O'akala. Her description of the Kaiwiki Mill follows:

Then there is the sugar plantation of Kaiwiki, with its patches of bright green cane, its flumes crossing the track above our heads, bringing the cane down from the upland cane-fields to the crushing-mill, and the shifting, busy scenes of the sugar-boiling season.

Then the track goes down with a great dip, along which we slip and slide in the mud to a deep broad stream. This is a most picturesque spot, the junction of two clear bright rivers, and a few native houses and a Chinaman's store are grouped close by under some palms, with the customary loungers on horseback,

asking and receiving nuhou, or news, at the doors. Our accustomed horses leaped into a ferry-scow provided by Government, worked by a bearded female of hideous aspect, and leaped out on the other side to climb a track cut on the side of a precipice, which would be steep to mount on one's own feet. There we met parties of natives, all flower-wreathed, talking and singing, coming gaily down on their sure-footed horses, saluting us with the invariable "Aloha." Every now and then we passed native churches, with spires painted white, or a native schoolhouse, or a group of scholars all ferns and flowers. The greenness of the vegetation merits the term "dazzling." We think England green, but its colour is poor and pale as compared with that of tropical Hawaii. Palms, candlenuts, ohias, hibiscus, were it not for their exceeding beauty, would almost pall upon one from their abundance, and each gulch has its glorious entanglement of breadfruit, the large-leaved ohia, or native apple, a species of *Eugenia* (*Eugenia Malaccensis*), and the pandanus, with its aerial roots, all looped together by large sky-blue convolvuli and the running fern, and is marvellous with parasitic growths.

The unique beauty of this coast is what are called gulches—narrow deep ravines or gorges, from 100 to 2,000 feet in depth, each with a series of cascades from 10 to 1,800 feet in height. I dislike reducing their glories to the baldness of figures, but the depth of these clefts (originally, probably, the seams caused by fire torrents), cut and worn by the fierce streams fed by the snows of Mauna Kea, and the rains of the forest belt, cannot otherwise be expressed. The cascades are most truly beautiful, gleaming white among the dark depths of foliage far away, and falling into deep limpid basins, festooned and overhung with the richest and greenest vegetation of this prolific climate, from the huge-leaved banana and shining breadfruit to the most feathery of ferns and lycopodiums. Each gulch opens on a velvet lawn close to the sea, and most of them have space for a few grass houses, with coconut trees, bananas, and kalo patches. There are sixty-nine of these extraordinary chasms within a distance of thirty miles!

I think we came through eleven, fording the streams in all but two. The descent into some of them is quite alarming. You go down almost standing in your stirrups, at a right angle with the horse's head, and up, grasping his mane to prevent the saddle slipping. He goes down like a goat, with his bare feet, looking cautiously at each step, sometimes putting out a foot and withdrawing it again in favour of better footing, and sometimes gathering his four feet under him and sliding or jumping. The Mexican saddle has great advantages on these tracks, which are nothing better than ledges cut on the sides of precipices, for one goes up and down not only in perfect security but without fatigue. I am beginning to hope that I am not too old, as I feared I was, to learn a new mode of riding, for my companions rode at full speed over places where I should have picked my way carefully at a foot's pace; and my horse followed them, galloping and stopping short at their pleasure, and I successfully kept my seat, though not without occasional fears of an ignominious downfall! I even wish that you could see me in my Rob Roy riding dress, with leather belt and pouch, a lei of the orange seeds of



the pandanus round my throat, jingling Mexican spurs, blue saddle blanket, and Rob Roy blanket strapped on behind the saddle!

This place is grandly situated 600 feet above a deep cove, into which two beautiful gulches of great size run, with heavy cascades, finer than Foyers at its best, and a native village is picturesquely situated between the two. The great white rollers, whiter by contrast with the dark deep water, come into the gulch just where we forded the river, and from the ford a passable road made for hauling sugar ascends to the house. The air is something absolutely delicious; and the murmur of the rollers and the deep boom of the cascades are very soothing. There is little rise or fall in the cadence of the surf anywhere on the windward coast, but one even sound, loud or soft, like that made by a train in a tunnel.

We were kindly welcomed, and were at once "made at home." Delicious phrase! the full meaning of which I am learning on Hawaii, where, though everything has the fascination of novelty, I have ceased to feel myself a stranger. This is a roomy, rambling frame-house, with a verandah, and the door, as is usual here, opens directly into the sitting-room. The stair by which I go to my room suggests possibilities, for it has been removed three inches from the wall by an earthquake, which also brought down the tall chimney of the boiling-house. Close by there are small pretty frame-houses for the overseer, bookkeeper, sugar boiler, and machinist; a store, the factory, a pretty native church near the edge of the cliff, and quite a large native village below. It looks green and bright, and the atmosphere is perfect, with the cool air coming down from the mountains, and a soft breeze coming up from the blue dreamy ocean. Behind the house the uplands slope away to the colossal Mauna Kea. The actual, dense, impenetrable forest does not begin for a mile and a half from the coast, and its broad dark belt, extending to a height of 4,000 feet, and beautifully broken, throws out into greater brightness the upward glades of grass and the fields of sugar-cane.

This is a very busy season, and as this is a large plantation there is an appearance of great animation. There are five or six saddled horses usually tethered below the house; and with overseers, white and coloured, and natives riding at full gallop, and people coming on all sorts of errands, the hum of the crushing-mill, the rush of water in the flumes, and the grind of the waggons carrying cane, there is no end of stir.

The plantations in the Hilo district enjoy special advantages, for by turning some of the innumerable mountain streams into flumes the owners can bring a great part of their cane and all their wood for fuel down to the mills without other expense than the original cost of the woodwork. Mr. A. has 100 mules, but the greater part of their work is ploughing and hauling the kegs of sugar down to the cove, where in favourable weather they are put on board of a schooner for Honolulu. This plantation employs 185 hands, native and Chinese, and turns out 600 tons of sugar a year. The natives are much liked as labourers, being docile and on the whole willing; but native labour is hard to get, as the natives do not

like to work for a term unless obliged, and a pernicious system of "advances" is practised. The labourers hire themselves to the planters, in the case of natives usually for a year, by a contract which has to be signed before a notary public. The wages are about eight dollars a month with food, or eleven dollars without food, and the planters supply houses and medical attendance. The Chinese are imported as coolies, and usually contract to work for five years. As a matter of policy no less than of humanity the "hands" are well treated; for if a single instance of injustice were perpetrated on a plantation the factory might stand still the next year, for hardly a native would contract to serve again.

The Chinese are quiet and industrious, but smoke opium, and are much addicted to gaming. Many of them save money, and, when their turn of service is over, set up stores, or grow vegetables for money. Each man employed has his horse, and on Saturday the hands form quite a cavalcade. Great tact, firmness, and knowledge of human nature are required in the manager of a plantation. The natives are at times disposed to shirk work without sufficient cause; the native lunas, or overseers, are not always reasonable, the Chinamen and natives do not always agree, and quarrels and enanglements arise, and everything is referred to the decision of the manager, who, besides all things else, must know the exact amount of work which ought to be performed, both in the fields and factory, and see that it is done. Mr. A. is a keen, shrewd man of business, kind without being weak, and with an eye on every detail of his plantations. The requirements are endless. It reminds me very much of plantation life in Georgia in the old days of slavery. I never elsewhere heard of so many headaches, sore hands, and other trifling ailments. It is very amusing to see the attempts which the would-be invalids make to lengthen their brief smiling faces into lugubriousness, and the sudden relaxation into naturalness when they are allowed a holiday. Mr. A. comes into the house constantly to consult his wife regarding the treatment of different ailments.

I have made a second tour through the factory, and am rather disgusted with sugar making. "All's well that ends well," however, and the delicate crystalline result makes one forget the initial stages of the manufacture. The cane, stripped of its leaves, passes from the flumes under the rollers of the crushing-mill, where it is subjected to a pressure of five or six tons. One hundred pounds of cane under this process yield up from sixty-five to seventy-five pounds of juice. This juice passes, as a pale green cataract, into a trough, which conducts it into a vat, where it is dosed with quicklime to neutralize its acid, and is then run off into large heated metal vessels. At this stage the smell is abominable, and the turbid fluid, with a thick scum upon it, is simply disgusting. After a preliminary heating and skimming it is passed off into iron pans, several in a row, and boiled and skimmed, and ladled from one to the other till it reaches the last, which is nearest to the fire, and there it boils with the greatest violence, seething and foaming, bringing all the remaining scum to the surface. After the concentration has proceeded far enough, the action of the heat is suspended, and the reddish-brown, oily-looking liquid is drawn into the vacuum-pan till it is about a third full; the



concentration is completed by boiling the juice in vacuo at a temperature of 150 degrees, and even lower. As the boiling proceeds, the sugar boiler tests the contents of the pan by withdrawing a few drops, and holding them up to the light on his finger; and, by certain minute changes in their condition, he judges when it is time to add an additional quantity. When the pan is full, the contents have thickened into the consistency of thick gruel by the formation of minute crystals, and are then allowed to descend into an heater, where they are kept warm till they can be run into "forms" or tanks, where they are allowed to granulate. The liquid, or molasses, which remains after the first crystallization is returned to the vacuum pan and reboiled, and this reboiling of the drainings is repeated two or three times, with a gradually decreasing result in the quality and quantity of the sugar. The last process, which is used for getting rid of the treacle, is a most beautiful one. The mass of sugar and treacle is put into what are called "centrifugal pans," which are drums about three feet in diameter and two feet high, which make about 1,000 revolutions a minute. These have false interiors of wire gauze, and the mass is forced violently against their sides by centrifugal action, and they let the treacle whirl through, and retain the sugar crystals, which lie in a dry heap in the centre.

The cane is being flumed in with great rapidity, and the factory is working till late at night. The cane from which the juice has been expressed, called "trash," is dried and used as fuel for the furnace which supplies the steam power. The sugar is packed in kegs, and a cooper and carpenter, as well as other mechanics, are employed.

Sugar is now the great interest of the islands. Christian missions and whaling have had their day, and now people talk sugar. Hawaii thrills to the news of a cent up or a cent down in the American market. All the interests of the kingdom are threatened by this one, which, because it is grievously depressed and staggers under a heavy import duty in the American market, is now clamorous in some quarters for "annexation," and in others for a "reciprocity treaty," which last means the cession of the Pearl River lagoon on Oahu, with its adjacent shores, to America, for a Pacific naval station. There are 200,000 acres of productive soil on the islands, of which only a fifteenth is under cultivation, and of this large area 150,000 is said to be specially adapted for sugar culture. Herein is a prospective Utopia, and people are always dreaming of the sugar-growing capacities of the belt of rich disintegrated lava which slopes upwards from the sea to the bases of the mountains. Hitherto, sugar growing has been a very disastrous speculation, and few of the planters at present do more than keep their heads above water.

Were labour plentiful and the duties removed, fortunes might be made; for the soil yields on an average about three times as much as that of the State of Louisiana. Two and a half tons to the acre is a common yield, five tons, a frequent one, and instances are known of the slowly matured cane of a high altitude yielding as much as seven tons! The magnificent climate makes it a very easy crop to grow. There is no brief harvest time with its rush, hurry, and frantic demand for labour, nor frost to render necessary the hasty cutting of an immature

crop. The same number of hands is kept on all the year round. The planters can plant pretty much when they please, or not plant at all, for two or three years, the only difference in the latter case being that the ratoons which spring up after the cutting of the former crop are smaller in bulk. They can cut when they please, whether the cane be tasselled or not, and they can plant, cut, and grind at one time!

It is a beautiful crop in any stage of growth, especially in the tasselled stage. Every part of it is useful—the cane pre-eminently—the leaves as food for horses and mules, and the tassels for making hats. Here and elsewhere there is a plate of cut cane always within reach, and the children chew it incessantly. I fear you will be tired of sugar, but I find it more interesting than the wool and mutton of Victoria and New Zealand, and it is a most important item of the wealth of this toy kingdom, which last year exported 16,995,402 lbs. of sugar and 192,105 gallons of molasses.[Footnote: In 1875 the export of sugar reached a total of 25,080,182 lbs.] With regard to molasses, the Government prohibits the manufacture of rum, so the planters are deprived of a fruitful source of profit. It is really difficult to tear myself from the subject of sugar, for I see the cane waving in the sun while I write, and hear the busy hum of the crushing-mill [Bird 2007:72-78].

Bird was staying at the Onomea Plantation as a guest at the time. The Onomea Plantation was owned by her host Judge S.L. Austin who started the plantation in 1863 (Campbell and Ogburn 1990). A description of the Onomea Plantation works by Campbell and Ogburn (1990) is quoted below.

During the early days, Onomea's crushing plant was water driven. A metal water wheel and boiler had been shipped from Glasgow, Scotland in 1862. Water from the flumes provided the power to turn the wheel, which in turn moved the sugar cane crusher. The water-driven crushing plant was much larger and heavier than those of other mills. The mill was situated just below Papaikou at the foot of a gulch, which opened out to the ocean. It was the first nine-roller mill erected on the island. The mill was connected by rail to one of the best landings and loading devices on the coast. The sugar cars were hauled to the landing by a cable and sugar could be sent over the main cable to the hold of a ship without rehandling. By means of this device about 1,600 bags of sugar could be loaded in an hour.

A distinctive feature of Onomea was its system of flumes, which spanned gorges and carried cane down the slopes to the mill. Fifty-five miles of



stationary and portable flumes were constructed. The trestle, which carried the main flume across Hanawainui Gulch, was the largest wooden bridge in the territory and the one spanning Kawainui Gulch was the highest, 176 feet. Onomea's location in a heavy rainfall belt made it difficult to mechanize cane harvesting and transportation easily. Onomea was one of the last plantations to stop hand cutting cane. However, progress was made and the extensive road building program begun in 1903 was finally completed in 1956.

The heavy rainfall also tended to wash topsoil away and leach it out.

Onomea was the first Hawaiian sugar plantation to use commercial fertilizer on its fields. In 1879 (1897?), bone meal fertilizer was used to improve the soil. Later on Manager John T. Moir's protective efforts towards Onomea's topsoils resulted in the invention of a plow which was adapted to the peculiar topography of the county and the nature of the soil. The shallow, clay-like soils were subject to washing unless properly cultivated. It is to Moir's credit that no field was washed out to sea during his 20 years of management. He was also considered one of the leaders in the conservation of waste products and the use of them to build up the land.

The descriptions of the Kaiwiki and Onomea plantations are good period descriptions of sugar plantations and operations in the area of the Hamakua Sugar Plantation that was soon to be operated within the project area.

#### NATIVE TESTIMONY BEFORE THE COMMISSION TO QUIET LAND TITLES

With the Mahele of 1848 and the two Acts of 1850, authorizing the sale of land in fee simple to resident aliens and the award of *kuleana* lands to native tenants, land tenure in Hawaii arrived at a significant turning point (Chinen 1961:13). Two Land Commission Awards were made within the project area. One half of Malanahae Ahupua'a was awarded to Simeonea Luluhiwalani (LCA 4: B, R.P. 7825). Two *'apana* (LCA 9971: A and B) in Waikōloa Ahupua'a were awarded to William Pitt Leleihoku. There is no descriptive information given for Leleihoku's two *'apana* in Waikōloa Ahupua'a. Luluhiwalani states in his claim in Malanahae that his right to the land was acquired when

Kamehameha II sailed to Kawaihae - this was Kaneuwaine [1819] - the land of the Ali'i was cut up there. Then the Ali'i gave Malanahae to Hikiau. Kaleimoku said "This land is for my *kaikaina*." Then the chiefs asked, "To whom?" To Keoua, he is a *kaikaina* of us all. Kaleimoku approved /saying/ "This is my very own *kaikaina*." Then the Ali'i gave this land to him absolutely. Keoua was with Keemoku at this time. /The land was held/ from this time. At the time in which

Kamehameha II sailed for England, in the night Keoua died, and the next day the Ali'i sailed for England.

When he was alive, Keoua directly bequeathed all his lands to me. I am above, my *makua*line is below /one the lands held/ from Hawaii to Oahu. These are the land which I hereby present /as claims/ at this time (Waihona 'Aina 2000).

#### THE HISTORY OF SUGAR IN HAWAII

Captain Cook found sugarcane (*Saccharum officinarum*) growing in Hawaii at the time of his arrival in 1778 (Beaglehole 1967:479). He noted that the cane was of large size and good quality. According to Hawaiians, sugarcane (*kō*) grew wild and quite well in the valleys and lowlands. It was not refined but was eaten as a food crop and was used as an offering, especially to the shark god *Mano* (Rolph 1917:166). Captain James King also noted that upon his arrival at Maui in 1778, Hawaiians came along ship carrying sugarcane as well as fruits and vegetables (Beaglehole 1967:497). Several sugarcane varieties, either indigenous or brought by early Polynesians, were known to the Hawaiians, including *Udalahu*, *Udalahu maoli* (native), *Honaula*, *Laukena* (*Laukono*), *Kea* (*Kokea*), *Papa*, and *Ohua* (Wilfong 1883).

The earliest instances of sugar and molasses production in Hawaii remain uncertain, but were likely small-scale sugar extraction operations. A number of important chiefs set aside land for several of these early endeavors (Kelly *et al.* 1981:81). Rolph (1917:166-167) documents the inception of organized sugar production as follows:

L. L. Torbert, one of the early planters, in a paper read before the Royal Agricultural Society in January, 1852, claims the earliest sugar factory was put up on the island of Lanai in 1802 by a Chinaman who came to the islands in one of the vessels trading for sandalwood. He brought with him a stone mill and boilers, and after grinding one small crop and making it into sugar, went away the next year taking his apparatus with him.

Anderson [Anderson, Rufus, *The Hawaiian Islands*, Boston, 1864] makes a statement that 257 tons of sugar were exported from the islands in 1814, but cites no authority upon which to base his assertion.

According to Jarves [Jarves, James Jackson, *History of the Sandwich Islands*, Honolulu, 1872] the first instance of the manufacture of sugar goes back to beyond 1820, but the name of the pioneer planter is unknown. It is certain that at first molasses was manufactured and then sugar some time before 1820.

Don Francisco de Paula made sugar in Honolulu in 1819, the year before the arrival of the first missionaries. Lavinia, an Italian, did the same thing in 1823.

His method was to pound the cane with stone pestles on huge wooden trays (poi boards) by native labor, collecting the juice and boiling it in a small copper kettle.

Accounts from various sources agree that the making of sugar and molasses was general in 1823-24. This undoubtedly had direct connection with the manufacture of rum, which was extensively carried on at the time.

In 1828 a considerable amount of cane was raised in the Nuuanu valley and Waikapu, Maui. A pioneer cane grower, Antonio Silva by name, lived at the latter place, and some Chinamen had a sugar mill near Hilo. In those days mills were made of wood, very crudely put together and worked by oxen.

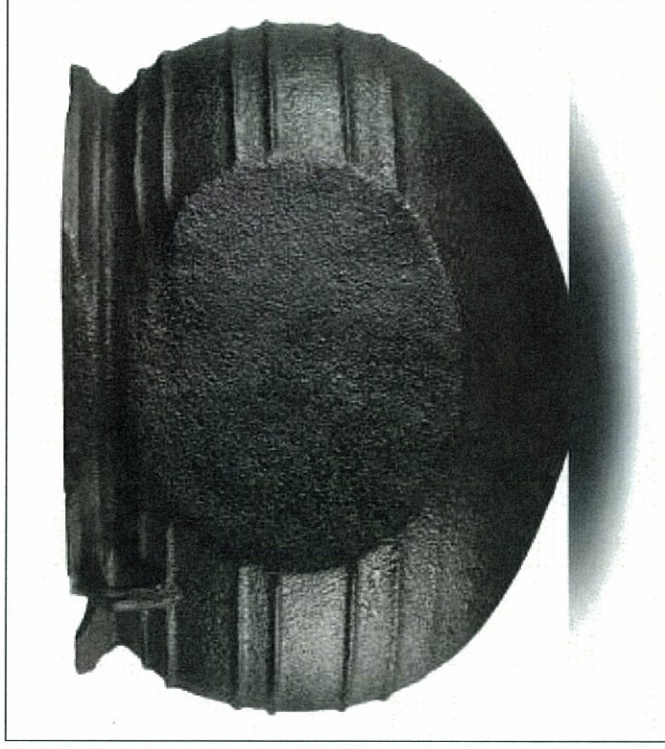
Ladd & Company established the first large-scale sugar production in Hawai'i on Kauai, while David Malo operated a mill on Maui between 1840 and 1850, and Governor Kuakini directed the planting of one hundred acres of sugar cane in 1839 in Kohala, on the Island of Hawai'i (Rolph 1917:169). Missionaries at Hilo in the early 1800s produced sugar and molasses for their own use (Kelly *et al.* 1981:81). In 1841, a mill on the Wailuku River in Hilo on Governor Kuakini's land, and likely operated by Chinese, produced about 30 tons of sugar.

Sugarcane growing and milling operations were still simple. Cane fields were neither irrigated nor fertilized and sugar yields were roughly one ton per acre. Planting, by 'o'o (digging stick), and harvesting was done by Hawaiian contract workers (Thrum 1874:36). Laborers were paid in kind, often in cloth. Once at the milling facilities, cane was fed one stalk at a time into iron band reinforced wooden rollers powered by water, oxen, mule, and horse. The juice extracted by the rollers was collected in a trough and was boiled in whaling ship iron trypots (Figure 6). Less than 50% of the sugar was extracted from the cane using these methods.

Additionally, production was low because indigenous sugarcanes were susceptible to introduced disease and were soft and therefore unsuitable for milling (Mangelsdorf 1956).

Lahaina sugarcane, a variety indigenous to the Marquesas, was introduced to Hawai'i in 1854, and by 1870 had displaced all indigenous varieties for sugar production (Wilfong 1883). Hawaiian sugar production remained low despite the introduction of steam power in 1858-1859 to the milling process. The Island of Hawai'i had a single mill operating at Hilo until the outbreak of the American Civil War (1861-1865). The disruption of sugar production in the American south caused a price increase and a concomitant rise in Hawaiian sugar production and export, from 2,600 tons in 1863 to 8,869 tons in 1866 (Rolph 1917:171). The rapid growth of the sugar industry created a labor shortage that necessitated hiring contract laborers from other Polynesian islands.

Hawaiian sugar production was still somewhat hindered by U.S. import duties, until a reciprocity treaty negotiated between the Kingdom of Hawai'i and the U.S. in 1876 reduced import duties levied on Hawaiian sugar, increasing the profitability of sugar production and further spurring the growth of the sugar industry. From 1877 to 1888, sugar production increased almost 500% and doubled in the following ten years (Kelly *et al.* 1981:81). American consumers purchased nearly 99% of all Hawaiian export products, much of it sugar.



**Figure 6: A Whaling Trypot Typical of Those Used For Making Raw Sugar.**

In 1880 Rose Bamboo sugar cane was introduced from Australia and was grown at higher elevations on Hawai'i. Rose Bamboo cane did especially well on the relatively high table lands along the Hāmākua coast. Lahaina and Rose Bamboo varieties were susceptible to insects and



disease and subsequently yields decreased annually until both varieties were completely replaced around the turn of the century by Yellow Caledonia cane (also called White Tanna cane), a variety named for New Caledonia and Tanna, an island of present day Vanuatu (Rolph 1917:170). Yellow Caledonia had been imported to Hawai'i in 1881 and was first grown with great success in Ka'u (Tew 1987). The variety was resistant to disease and grew well in cooler climates with moderately high rainfall, and consequently was cultivated with great success along the Hāmākua until its replacement in 1925 with hybrid varieties of sugarcane (James 2004:5).

The Hawaiian sugar industry continued to grow and additional contract laborers were hired from as far away as China and Japan (after 1890), and later from Korea, the Philippines, Puerto Rico, and Portugal. Sugar plantations began offering free medical care and rent-free housing to attract laborers. The annexation of Hawai'i by the U.S. in 1898 ensured the continued American consumer demand for Hawaiian sugar. Additionally, incorporation provided new funding for needed public works to improve the transportation and shipping facilities that made the sugar trade more profitable. The development of port facilities and the extensive railroad system that ran from Kalapana in South Puna to Pa'auiolo along the Hāmākua coast were a direct result of the sugar industry.

#### THE HISTORY OF SUGAR IN THE KAPULENA AREA

Seven sugar companies were established along the Hāmākua coast between 1869 and 1880, excepting Onomea Plantation in the Hilo area (Bouvet 2001:9). Geographically, from the Hilo to Kohala sides of the Hāmākua, they were the Laupahoehoe Sugar Company (est. 1880), the O'okala Sugar Plantation Company (est. 1869), the Kukaiau Sugar Company (est. 1887), the Hamakua Sugar Company (est. 1877), the Paauhau Sugar Company (est. 1878), the Honokaa Sugar Company (est. 1878), and the Pacific Sugar Mill Company (est. 1878).

#### PACIFIC SUGAR MILL COMPANY (1878-1928)

The Pacific Sugar Mill Company was established in 1878 at Kukuiahae and cultivated sugar cane in fields within the current project area. A good synoptic history published on the University of Hawai'i's Hawaiian Sugar Planters' Association Plantation Archives states that the

Pacific Sugar Mill was located on the northeast coast of the Island of Hawai'i between Honokaa and Waipio Valley. It extended along the coast for four miles and up the mountains from two to nine miles. The elevation ranged from 300 to 1,900 feet giving a variety of growing conditions. Half of the land was arable; the remainder was pasture and forests.

The beginnings of Pacific Sugar Mill are not entirely clear. A Charter of Incorporation (HSC 48/13 Doc #142) dated August 19, 1879 lists Samuel Parker and F.A. Schaefer as the founders. Other published sources cite Dr. Mott-Smith, Dr. Troussseau and Mr. Herbert Purvis as founders/ proprietors of the enterprise. Material in the collection does confirm that the plantation was started in 1878 and the first crop harvested in 1880 with F.A. Schaefer and Co. as the agents.

Pacific Sugar Mill had the distinction of introducing the first mongoose into Hawai'i. In 1883 W.H. Purvis imported them from India and Africa for rat control on the plantation. Pacific Sugar Mill also experimented growing canaigre roots (tanners' dock) when Mr. J. Marsden, Commissioner of Agriculture, imported the seed of this plant in 1895. It was expected that the root would become a rich source of tannin for use in the leather industry. This was an early attempt to diversify and utilize land unsuitable for cane.

Most plantations had a small herd of cattle but Pacific Sugar Mill was unusual because it also had over 600 head of sheep. Free mutton was provided as a perquisite for employees along with free housing, fuel and medical care. As on most plantations, the early work force consisted of Chinese and native Hawaiians. Later on Japanese, Portuguese, Spaniards, Puerto Ricans, Koreans and Filipinos performed both as day laborers and contract workers.

By 1908 Pacific Sugar Mill had a nine-roller mill and produced an average crop of three tons per acre. The cane was delivered by flumes to a railroad, which traversed the plantation from east to west. The railroad was about four miles long and extended from the mill to Honokaa's boundary. Pacific Sugar Mill also had a wire rope landing to transport sugar bags to steamers for shipment.

The water for the flumes was obtained by diverting the Hīlawa Stream, which had its source in the Kohala Mountains. Pacific Sugar Mill also had the water rights to Lalakea Stream and to Kukuiahae Valley Stream. The water was transported partly through a flume and partly by a ditch to a reservoir at the head of the plantation. Four more reservoirs with an estimated capacity of 50,000,000 gallons were also constructed. This supply of water not only enabled Pacific Sugar Mill to transport all of its cane to the mill but was sufficient enough to enable Honokaa Sugar Company to flume 50% of its crop.

In spite of an abundant water supply, the plantation did not prosper due to mismanagement. In 1907 a glanders epidemic broke out because of poor conditions in the stables and most of the livestock had to be destroyed. The mill and housing were in serious disrepair. As part of a retrenchment effort in 1913, it was decided that the mill would be closed down and all the cane would be sent to Honokaa for grinding. At this time the administration of both plantations was brought under the manager in order to eliminate excess labor, machinery and costs. In 1916, Pacific Sugar Mill sold its mill equipment to Mitsui Company of Japan.



This partial merger with Honokaa proved to be such a success that a proposal was made for an amalgamation of all interests to bring about added savings and facilitate the economic management of the two plantations. Pacific Sugar Mill was formally dissolved on August 24, 1928 and became the Kukuiahaele Division of Honokaa Sugar Company (Campbell and Ogburn 1989b).

#### HONOKAA SUGAR MILL COMPANY (1878-1928)

The Honokaa Sugar Company grew to encompass more than 9,000 acres (Campbell and Ogburn 1989a). The Honokaa Sugar Company had an extensive flume system to carry cane to railroad cars that brought the cane to the mill. The mill had a tramway that transported the bagged sugar to the warehouse at the boat landing. The sugar was then loaded onto steamships by means of a wire cable. The Honokaa Sugar Company was able to ship raw sugar directly to the mainland by this method, instead of first shipping to Honolulu.

#### DAVIES HAMAKUA SUGAR COMPANY (1978-1984) AND HAMAKUA SUGAR COMPANY (1984-1994)

The Laupahoehoe Sugar Company merged with the Honokaa Sugar Company in 1978 to form the Davies Hamakua Sugar Company (1978-1984). In 1984 the Davies Hamakua Sugar Company was bought by Francis Morgan and renamed the Hamakua Sugar Company (1984-1994). The Hamakua Sugar Company operated until October of 1994, and its closing marked the end of the sugar industry on the Island of Hawai'i.

#### CULTURAL INFORMANT INTERVIEWS

SCS, Inc contacted seven individuals who either worked for the Hamakua Sugar Company, or live in Hamakua District and have knowledge of the lands of Kapulea (Table 1). Six of the individuals were reached by phone. Of the six, one person had knowledge of the project area and provided information. None of the informants had knowledge of past or ongoing cultural practices on the project area property.

Table 1: Individuals Responding to CIA.

| Name           | Affiliation                        | Responded ? | Has Knowledge? |
|----------------|------------------------------------|-------------|----------------|
| Terry Knabusch | Hamakua Sugar Office               | Yes         | No             |
| Faye Honma     | Hamakua Sugar Office               | Yes         | No             |
| Jim Thropp     | Hamakua Sugar                      | Yes         | Yes            |
| Gary Aganus    | Agriculturalist                    |             |                |
|                | Hamakua Sugar Field Superintendent | Yes         | No             |
| Rick Toledo    | Hamakua Sugar Field Superintendent | No          | Unknown        |
| Ku Kahakalau   | Hawai'i Island Burial              | No          | Unknown        |

|               |                           |    |         |
|---------------|---------------------------|----|---------|
| Denny Mathews | Council, Hamakua District | No | Unknown |
|---------------|---------------------------|----|---------|

#### JIM THROPP INTERVIEW (PA'AUILO, HAWAII)

Jim was born in Honolulu and grew up in Kāne'ohe. He was 75 years old at the time of this interview. He studied general agriculture at California Polytechnic State University where he was awarded a degree in general crops production. He worked at a sugar plantation on Kaua'i before being hired by the Hamakua Sugar Company. Jim was in charge of crop logging, tissue testing, and fertilizer application. He remembers that the soil on the study parcel are weak in calcium, nitrogen, and phosphorus. He also stated that the earthen ditches on the project area are contour ditches created to draw water off of the fields and into the gulches. These are part of a man-made drainage system to prevent sheet wash and flooding down-slope. Jim did not remember any traditional Hawaiian features on either of the parcels. He said that by the time he was there, the company was using machinery to work the fields and harvest the crops. That meant that all rock was removed from the fields and pushed into the gulches to prevent the rock from fouling or damaging the machinery. He remembers that there were some large *ulu* trees in some of the gulches. Jim did not know of any cultural practices that might have been conducted during his time working for the plantation company.

#### SUMMARY

The "level of effort undertaken" to identify potential effect by a project to cultural resources, places or beliefs (OEQC 1997) has not been officially defined and is left up to the investigator. A good faith effort can mean contacting agencies by letter, interviewing people who may be affected by the project or who know its history, research identifying sensitive areas and previous land use, holding meetings in which the public is invited to testify, notifying the community through the media, and other appropriate strategies based on the type of project being proposed and its impact potential. Sending inquiring letters to organizations concerning development of a piece of property that has already been totally impacted by previous activity and is located in an already developed industrial area may be a "good faith effort". However, when many factors need to be considered, such as in coastal or mountain development, a good faith effort might mean an entirely different level of research activity.

In the case of the present parcel, letters of inquiry were sent to organizations whose expertise would include the project area. Consultation was sought from Kai Markell, the Director of Native Rights, Land and Culture, Office of Hawaiian Affairs on O'ahu; Ruby McDonald,

Coordinator of the Hawai'i branch of the Office of Hawaiian Affairs; the Waimea Hawaiian Civic Club; Ku Kahakahu; Keawe Vredenburg; Dr. Billy Bergin; Clement Junior Kanuha; and Reggie Lee. Public notices were published in Ka Wai Ola, The Advertiser, and the Tribune Herald.

Historical and cultural source materials were extensively used and can be found listed in the References Cited portion of the report. Such scholars as I'i, Kamakau, Chinen, Kame'ele'iha, Fornander, Kuykendall, Kelly, Handy and Handy, Puku'i and Elbert, Thrum, and Cordy have contributed, and continue to contribute to our knowledge and understanding of Hawai'i, past and present. The works of these and other authors were consulted and incorporated in the report where appropriate. Land use document research was supplied by the Waihona 'Aina 2007 Data Base.

#### CIA INQUIRY RESPONSE

As suggested in the "Guidelines for Assessing Cultural Impacts" (OEQC 1997), CIAs incorporating personal interviews should include ethnographic and oral history interview procedures, circumstances attending the interviews, as well as the results of this consultation. It is also permissible to include organizations with individuals familiar with cultural practices and features associated with the project area.

As stated above, consultation was sought from the Director of Native Rights, Land and Culture, Office of Hawaiian Affairs on O'ahu; the Hawai'i branch of the Office of Hawaiian Affairs; the Kuukini Civic Club; and the Kona Hawaiian Civic Club. Except for OHA acknowledging the receipt of our letter, none of the organizations responded with information concerning the potential for cultural resources to occur in the project area, or with additional suggestions for further contacts.

Analysis of the potential effect of the project on cultural resources, practices or beliefs, its potential to isolate cultural resources, practices or beliefs from their setting, and the potential of the project to introduce elements which may alter the setting in which cultural practices take place is a requirement of the OEQC (No. 10, 1997). To our knowledge, the project area has not been used for traditional cultural purposes within recent times. Based on historical research and no response from the above listed contacts, it is reasonable to conclude that Hawaiian rights related to gathering, access or other customary activities within the project area will not be affected and there will be no direct adverse effect upon cultural practices or beliefs. The visual

impact of the project from surrounding vantage points, e.g. the highway, mountains, and coast would appear to be minimal.

#### CULTURAL ASSESSMENT

Based on organizational response as well as archival research, it is reasonable to conclude that, pursuant to Act 50, the exercise of native Hawaiian rights, or any ethnic group, related to gathering, access or other customary activities will not be affected by development activities on this parcel. Because there were no cultural activities identified within the project area, there are no adverse effects.



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OEQC Office of Environmental Quality Control



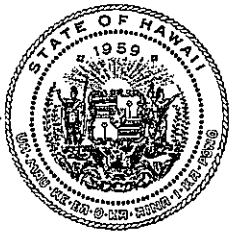
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Appendix *E*

{ Pre-Consultation Comments and Responses }





**DEPARTMENT OF BUSINESS,  
ECONOMIC DEVELOPMENT & TOURISM**

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August 27, 2009

**RECEIVED**

AUG 23 2009

PBR HAWAII

Ms. Catie Fernandez  
Planner  
PBR Hawaii and Associates, Inc.  
1001 Bishop St  
ASB Tower, Suite 650  
Honolulu, Hawaii 96813-3484

Re: Pre-Assessment Consultation to Prepare Environmental Assessments for the sale of  
Hawaii County Hamakua Lands (Koholalele & Kapulena)-Preconsultation

In response to your August 7, 2009, notice, thank you for the opportunity to provide  
comments in the consultation phase of the Environmental Assessments for the sale of Hawaii  
County Hamakua Lands (Koholalele & Kapulena).

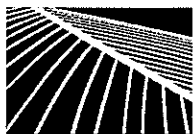
Our website provides detailed information on guidelines, directives and statutes, as  
well as studies and reports on aspects of energy and resource efficiency at:  
(<http://www.hawaii.gov/dbedt/info/energy/efficiency/state>). Please also do not hesitate to  
contact Carilyn Shon, Energy Efficiency Branch Manager, at telephone number  
808-587-3810, for additional information on energy efficiency and renewable energy  
resources.

We look forward to reviewing the Draft Environmental Assessment.

Sincerely,

Theodore A. Peck  
Administrator

c: OEQC  
County of Hawaii, Department of Finance



# PBR HAWAII

& ASSOCIATES, INC.

December 23, 2010

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State of Hawai'i, DBEDT  
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**SUBJECT: ENVIRONMENTAL ASSESSMENT FOR AN AGRICULTURAL  
PARK AT APPROXIMATELY 1,700 ACRES OF HAWAII  
COUNTY LAND KAPULENA, HĀMĀKUA**

Dear Mr. Peck,

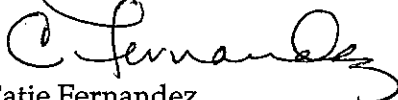
Thank you for your letter dated August 27, 2009 regarding the above referenced Draft Environmental Assessment. Through the pre-consultation process the project has evolved from the sale of the Kapulena lands to a partnership between the County, Hāmākua Farm Bureau, the Big Island Farm Bureau, Kamehameha Schools, the University of Hawai'i College of Agriculture and Forestry; the University of Hawai'i College of Tropical Agriculture and Human Resources; and The Kohala Center to develop an agricultural park. The new agricultural park will serve as the site for a pilot project to demonstrate best practices for sustainable and efficient grazing operations to benefit the grass-fed beef industry; as a test area for trials of orchard and other crops with potential for larger scale production; as an incubator and product handling area for trials of value-added agricultural products; and as a technical training site to help students learn cultivation, production, planning, marketing and business strategies for agricultural enterprises. The training component of the project is designed to establish and strengthen a family-farm based agricultural community in Hāmākua.

As the planning consultant for the applicant, County of Hawai'i, Department of Finance, we acknowledge your website offering detailed information on guidelines, directives and statutes as well as studies and reports on aspects of energy and resource efficiency.

Thank you for contributing to the development of this document. Your comments will be included in the Draft Environmental Assessment.

Sincerely,

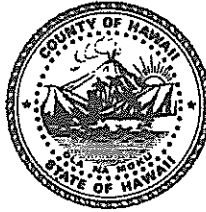
PBR HAWAII

  
Catie Fernandez  
Planner

cc: Kenneth Van Bergen, County of Hawai'i

O:\Job25\2506.19 Hawaii County-Hamakua Lands EA\EA\Pre-Consultation\Responses to Pre-Consultation  
Comments\Kapulena\DBEDT.doc

William P. Kenoi  
Mayor



Lono A. Tyson  
Director

Ivan M. Torigoe  
Deputy Director

**County of Hawai'i**  
**DEPARTMENT OF ENVIRONMENTAL MANAGEMENT**  
25 Aupuni Street • Hilo, Hawai'i 96720  
(808) 961-8083 • Fax (808) 961-8086  
[http://co.hawaii.hi.us/directory/dir\\_envmng.htm](http://co.hawaii.hi.us/directory/dir_envmng.htm)

RECEIVED

AUG 23 2009

PBR HAWAII

August 24, 2009

PBR HAWAII & ASSOCIATES, INC.  
1001 Bishop Street  
ASB Tower, Suite 650  
Honolulu, HI 96813-3484

Attention: Catie Fernandez  
Planner

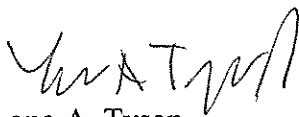
RE: Environmental Assessments for the sale of Hawai'i County Hāmākua Lands  
(Koholalele & Kapulena) - Preconsultation

Dear Ms. Fernandez,

We have no comments to offer on the subject sale.

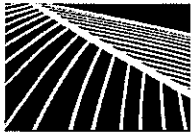
Thank you for allowing us to review and comment on this project.

With Regards and Aloha,

  
Lono A. Tyson  
DIRECTOR

12020R





# PBR HAWAII

& ASSOCIATES, INC.

December 23 , 2010

## PRINCIPALS

THOMAS S. WITTEN, ASLA  
*President*

R. STAN DUNCAN, ASLA  
*Executive Vice-President*

RUSSELL Y. J. CHUNG, FASLA, LEED® AP  
*Executive Vice-President*

VINCENT SHIGEKUNI  
*Vice-President*

GRANT T. MURAKAMI, AICP, LEED® AP  
*Principal*

W. FRANK BRANDT, FASLA  
*Chairman Emeritus*

## ASSOCIATES

TOM SCHNELL, AICP  
*Senior Associate*

RAYMOND T. HIGA, ASLA  
*Senior Associate*

KEVIN K. NISHIKAWA, ASLA  
*Associate*

KIMI MIKAMI YUEN, LEED® AP  
*Associate*

SCOTT ALIKA ABRIGO, LEED® AP  
*Associate*

SCOTT MURAKAMI, ASLA, LEED® AP  
*Associate*

DACHENG DONG, LEED® AP  
*Associate*

**HONOLULU OFFICE**  
1001 Bishop Street, Suite 650  
Honolulu, Hawai'i 96813-3484  
Tel: (808) 521-5631  
Fax: (808) 523-1402  
E-mail: sysadmin@pbrhawaii.com

**KAPOLEI OFFICE**  
1001 Kamokila Boulevard  
Kapolei Building, Suite 313  
Kapolei, Hawai'i 96707-2005  
Tel: (808) 521-5631  
Fax: (808) 535-3163

Lono A. Tyson  
County of Hawai'i  
Department of Environmental Management  
15 Aupuni Street  
Hilo, HI 96720

**SUBJECT: ENVIRONMENTAL ASSESSMENT FOR AN AGRICULTURAL  
PARK AT APPROXIMATELY 1,700 ACRES OF HAWAII  
COUNTY LAND KAPULENA, HĀMĀKUA**

Dear Mr. Tyson,

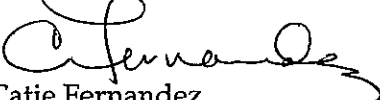
Thank you for your letter dated April 13, 2009 regarding the above referenced Draft Environmental Assessment. Through the pre-consultation process the project has evolved from the sale of the Kapulena lands to a partnership between the County, Hāmākua Farm Bureau, the Big Island Farm Bureau, Kamehameha Schools, the University of Hawai'i College of Agriculture and Forestry; the University of Hawai'i College of Tropical Agriculture and Human Resources; and The Kohala Center to develop an agricultural park. The new agricultural park will serve as the site for a pilot project to demonstrate best practices for sustainable and efficient grazing operations to benefit the grass-fed beef industry; as a test area for trials of orchard and other crops with potential for larger scale production; as an incubator and product handling area for trials of value-added agricultural products; and as a technical training site to help students learn cultivation, production, planning, marketing and business strategies for agricultural enterprises. The training component of the project is designed to establish and strengthen a family-farm based agricultural community in Hāmākua.

As the planning consultant for the applicant, County of Hawai'i, Department of Finance, we acknowledge that the Department of Environmental Management has no comments at this time.

Thank you for contributing to the development of this document. Your comments will be included in the Draft Environmental Assessment.

Sincerely,

PBR-HAWAII

  
Catie Fernandez  
Planner

cc: Kenneth Van Bergen, County of Hawai'i  
O:\Job25\2506.19 Hawaii County-Hamakua Lands EA\EA\Pre-Consultation\Responses to Pre-Consultation  
Comments\Kapulena\DEM.doc

LINDA LINGLE  
GOVERNOR OF HAWAII



LAURA H. THIELEN  
CHAIRPERSON  
BOARD OF LAND AND NATURAL RESOURCES  
COMMISSION ON WATER RESOURCE MANAGEMENT



STATE OF HAWAII  
DEPARTMENT OF LAND AND NATURAL RESOURCES  
LAND DIVISION

POST OFFICE BOX 621  
HONOLULU, HAWAII 96809

September 1, 2009

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SEP 02 2009

PBR HAWAII

PBR Hawaii & Associates, Inc.  
1001 Bishop Street  
ASB Tower Suite 650  
Honolulu, Hawaii 96813-3484

Attention: Ms. Catie Fernandez, Planner

Ladies and Gentlemen:

Subject: Pre-Consultation for Environmental Assessments for the Sale of Hawaii  
County Hamakua Lands

Thank you for the opportunity to review and comment on the subject matter. The Department of Land and Natural Resources' (DLNR), Land Division distributed or made available a copy of your report pertaining to the subject matter to DLNR Divisions for their review and comment.

Other than the comments from Commission on Water Resource Management, Land Division-Hawaii District, Division of Aquatic Resources, Division of Boating & Ocean Recreation, Engineering Division, Division of State Parks, the Department of Land and Natural Resources has no other comments to offer on the subject matter. Should you have any questions, please feel free to call our office at 587-0433. Thank you.

Sincerely,

*Charles E. Untch*  
for Morris M. Atta  
Administrator

LINDA LINGLE  
GOVERNOR OF HAWAII

LAURA H. THELEN  
CHAIRPERSON  
BOARD OF LAND AND NATURAL RESOURCES  
COMMISSION ON WATER RESOURCE MANAGEMENT

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LAND DIVISION



2009 AUG 13 A 11:35



2009 AUG 18 A 10:30  
STATE OF HAWAII  
DEPARTMENT OF LAND AND NATURAL RESOURCES  
LAND DIVISION  
DEPT. OF LAND & NATURAL RESOURCES  
POST OFFICE BOX 621  
STATE HONOLULU, HAWAII 96809

RECEIVED  
LAND DIVISION  
HONO, HAWAII

August 12, 2009

MEMORANDUM

TO: **DLNR Agencies:**  
☒ Div. of Aquatic Resources  
☒ Div. of Boating & Ocean Recreation  
☒ Engineering Division  
☒ Div. of Forestry & Wildlife  
☒ Div. of State Parks  
☒ Commission on Water Resource Management  
☒ Office of Conservation & Coastal Lands  
☒ Land Division - Hawaii District  
☒ Historic Preservation

RECEIVED

SEP 03 2009

PBR HAWAII

FROM: *for* Morris M. Atta *M. Atta*  
SUBJECT: Pre-consultation on environmental assessments for the sale of Hawaii County Hamakua lands  
LOCATION: Island of Hawaii  
APPLICANT: PBR Hawaii & Associates, Inc. on behalf of County of Hawaii

Transmitted for your review and comment on the above referenced document. We would appreciate your comments on this document. Please submit any comments by September 1, 2009.

If no response is received by this date, we will assume your agency has no comments. If you have any questions about this request, please contact my office at 587-0433. Thank you.

Attachments

- ( ) We have no objections.  
(✓) We have no comments.  
( ) Comments are attached.

Signed: *[Signature]*

Date: 8.14.09



LINDA LINGLE  
GOVERNOR OF HAWAII



RECEIVED  
LAND DIVISION

2009 AUG 25 P 3:21

LAURA H. THIELEN  
CHAIRPERSON  
BOARD OF LAND AND NATURAL RESOURCES  
COMMISSION ON WATER RESOURCE MANAGEMENT

STATE OF HAWAII  
DEPARTMENT OF LAND AND NATURAL RESOURCES  
LAND DIVISION  
POST OFFICE BOX 621  
HONOLULU, HAWAII 96809

August 12, 2009

RECEIVED

SEP 02 2009

PBR HAWAII

MEMORANDUM

TO: **DLNR Agencies:**

- ☒ Div. of Aquatic Resources
- ☒ Div. of Boating & Ocean Recreation
- ☒ Engineering Division
- ☒ Div. of Forestry & Wildlife
- ☒ Div. of State Parks
- ☒ Commission on Water Resource Management
- ☒ Office of Conservation & Coastal Lands
- ☒ Land Division - Hawaii District
- ☒ Historic Preservation

FROM:

for Morris M. Atta

SUBJECT: Pre-consultation on environmental assessments for the sale of Hawaii County Hamakua lands

LOCATION: Island of Hawaii

APPLICANT: PBR Hawaii & Associates, Inc. on behalf of County of Hawaii

Transmitted for your review and comment on the above referenced document. We would appreciate your comments on this document. Please submit any comments by September 1, 2009.

If no response is received by this date, we will assume your agency has no comments. If you have any questions about this request, please contact my office at 587-0433. Thank you.

Attachments

- ( ) We have no objections.
- (x) We have no comments.
- ( ) Comments are attached.

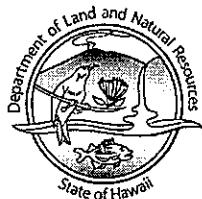
Signed:

Date:

*[Signature]*  
8/24/09

RU612'09AM10-5080R DIV

LINDA LINGLE  
GOVERNOR OF HAWAII



LAURA H. THIELEN  
CHAIRPERSON  
BOARD OF LAND AND NATURAL RESOURCES  
COMMISSION ON WATER RESOURCE MANAGEMENT

STATE OF HAWAII  
DEPARTMENT OF LAND AND NATURAL RESOURCES  
LAND DIVISION

POST OFFICE BOX 621  
HONOLULU, HAWAII 96809

August 12, 2009

RECEIVED  
LAND DIVISION

2009 AUG 19 A

DEPT. OF LAND  
NATURAL RESOURCES  
STATE OF HAWAII

| AQUATIC RESOURCES: 2547 |  |
|-------------------------|--|
| DIRECTOR                |  |
| COMM. FISH.             |  |
| AQ RES/ENV              |  |
| AQ REC                  |  |
| PLANNER                 |  |
| STAFF SVCS              |  |
| RCUH/UH                 |  |
| STATISTICS              |  |
| AFRC/FED AID            |  |
| EDUCATION               |  |
| SECRETARY               |  |
| OFFICE SVCS             |  |
| TECH ASST               |  |
| Return to:              |  |
| No. Copies              |  |
| Copies to:              |  |
| Due Date:               |  |

RN

MEMORANDUM

TO:

DLNR Agencies:

- ☒ Div. of Aquatic Resources
- ☒ Div. of Boating & Ocean Recreation
- ☒ Engineering Division
- ☒ Div. of Forestry & Wildlife
- ☒ Div. of State Parks
- ☒ Commission on Water Resource Management
- ☒ Office of Conservation & Coastal Lands
- ☒ Land Division -Hawaii District
- ☒ Historic Preservation



RECEIVED

SEP 03 2009

PBR HAWAII

FROM:

*for* Morris M. Atta *M. A. Kene*  
SUBJECT: Pre-consultation on environmental assessments for the sale of Hawaii County Hamakua lands

LOCATION: Island of Hawaii

APPLICANT: PBR Hawaii & Associates, Inc. on behalf of County of Hawaii

Transmitted for your review and comment on the above referenced document. We would appreciate your comments on this document. Please submit any comments by September 1, 2009.

If no response is received by this date, we will assume your agency has no comments. If you have any questions about this request, please contact my office at 587-0433. Thank you.

Attachments

- ( ) We have no objections.
- ( ☒ ) We have no comments.
- ( ) Comments are attached.

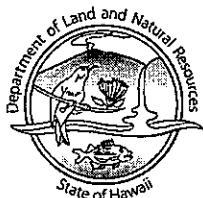
Signed: *[Signature]*

Date: 17 Aug 2009

2009 JUL -8 PM 12:58  
DIV OF AQUATIC RESOURCES  
H.L.O. HAWAII

RECEIVED

LINDA LINGLE  
GOVERNOR OF HAWAII



STATE OF HAWAII  
DEPARTMENT OF LAND AND NATURAL RESOURCES  
LAND DIVISION

POST OFFICE BOX 621  
HONOLULU, HAWAII 96809

August 12, 2009

RECEIVED  
LURA H. THIELEN  
CHAIRPERSON  
BOARD OF LAND AND NATURAL RESOURCES  
COMMISSION ON WATER RESOURCE MANAGEMENT

2009 AUG 12 PM 1:45

RECEIVED

SEP 02 2009

PBR HAWAII

MEMORANDUM

TO:

**DLNR Agencies:**

- ☒ Div. of Aquatic Resources
- ☒ Div. of Boating & Ocean Recreation
- ☒ Engineering Division
- ☒ Div. of Forestry & Wildlife
- ☒ Div. of State Parks
- ☒ Commission on Water Resource Management
- ☒ Office of Conservation & Coastal Lands
- ☒ Land Division - Hawaii District
- ☒ Historic Preservation

FROM:

for Morris M. Atta

SUBJECT: Pre-consultation on environmental assessments for the sale of Hawaii County Hamakua lands

LOCATION: Island of Hawaii

APPLICANT: PBR Hawaii & Associates, Inc. on behalf of County of Hawaii

Transmitted for your review and comment on the above referenced document. We would appreciate your comments on this document. Please submit any comments by September 1, 2009.

If no response is received by this date, we will assume your agency has no comments. If you have any questions about this request, please contact my office at 587-0433. Thank you.

**Attachments**

- ☐ We have no objections.
- ☒ We have no comments.
- ☐ Comments are attached.

Signed:

Date: 8.13.09

*Edwin T. Salas*

RECEIVED  
LAND DIVISION  
2009 AUG 13 P 2:07

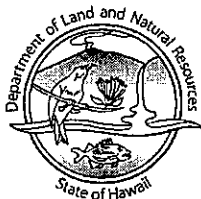


LINDA LINGLE  
GOVERNOR OF HAWAII

RECEIVED  
LAND DIVISION



LAURA H. THIELEN  
CHAIRPERSON  
BOARD OF LAND AND NATURAL RESOURCES  
COMMISSION ON WATER RESOURCE MANAGEMENT



2009 AUG 25 A 8:43

STATE OF HAWAII  
DEPARTMENT OF LAND AND NATURAL RESOURCES  
LAND DIVISION

POST OFFICE BOX 621  
HONOLULU, HAWAII 96809

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SEP 02 2009

PBR HAWAII

August 12, 2009

MEMORANDUM

TO:

**DLNR Agencies:**

- ☒ Div. of Aquatic Resources
- ☒ Div. of Boating & Ocean Recreation
- ☒ Engineering Division
- ☒ Div. of Forestry & Wildlife
- ☒ Div. of State Parks
- ☒ Commission on Water Resource Management
- ☒ Office of Conservation & Coastal Lands
- ☒ Land Division - Hawaii District
- ☒ Historic Preservation

FROM:

for Morris M. Atta

SUBJECT:

Pre-consultation on environmental assessments for the sale of Hawaii County Hamakua lands

LOCATION: Island of Hawaii

APPLICANT: PBR Hawaii & Associates, Inc. on behalf of County of Hawaii

Transmitted for your review and comment on the above referenced document. We would appreciate your comments on this document. Please submit any comments by September 1, 2009.

If no response is received by this date, we will assume your agency has no comments. If you have any questions about this request, please contact my office at 587-0433. Thank you.

Attachments

- ☐ We have no objections.
- ☐ We have no comments.
- ☒ Comments are attached.

Signed:

Date:

*C. H. H.*  
8/21/09

09 AUG 12 AM 09:45 ENGINEERING

DEPARTMENT OF LAND AND NATURAL RESOURCES  
ENGINEERING DIVISION

LD/MorrisAtta  
Ref.: PreConEASaleHamakuaLands  
Hawaii.441

**COMMENTS**

- ( ) We confirm that the project site, according to the Flood Insurance Rate Map (FIRM), is located in Flood Zone \_\_\_\_.
- (X) **Please take note that according to the maps that you provided, it appears that the project sites, according to the Flood Insurance Rate Map (FIRM), are located in Minimal Tsunami Inundation areas and Zone X. The National Flood Insurance Program does not have any regulations for developments within the Minimal Tsunami Inundation areas and Zone X.**
- ( ) Please note that the correct Flood Zone Designation for the project site according to the Flood Insurance Rate Map (FIRM) is \_\_\_\_.
- ( ) Please note that the project must comply with the rules and regulations of the National Flood Insurance Program (NFIP) presented in Title 44 of the Code of Federal Regulations (44CFR), whenever development within a Special Flood Hazard Area is undertaken. If there are any questions, please contact the State NFIP Coordinator, Ms. Carol Tyau-Beam, of the Department of Land and Natural Resources, Engineering Division at (808) 587-0267.

Please be advised that 44CFR indicates the minimum standards set forth by the NFIP. Your Community's local flood ordinance may prove to be more restrictive and thus take precedence over the minimum NFIP standards. If there are questions regarding the local flood ordinances, please contact the applicable County NFIP Coordinators below:

- ( ) Mr. Robert Sumitomo at (808) 768-8097 or Mr. Mario Siu Li at (808) 768-8098 of the City and County of Honolulu, Department of Planning and Permitting.
- ( ) Mr. Kelly Gomes at (808) 961-8327 (Hilo) or Mr. Kiran Emler at (808) 327-3530 (Kona) of the County of Hawaii, Department of Public Works.
- ( ) Mr. Francis Cerizo at (808) 270-7771 of the County of Maui, Department of Planning.
- ( ) Mr. Mario Antonio at (808) 241-6620 of the County of Kauai, Department of Public Works.
  
- ( ) The applicant should include water demands and infrastructure required to meet project needs. Please note that projects within State lands requiring water service from the Honolulu Board of Water Supply system will be required to pay a resource development charge, in addition to Water Facilities Charges for transmission and daily storage.
  
- ( ) The applicant should provide the water demands and calculations to the Engineering Division so it can be included in the State Water Projects Plan Update.
  
- (X) **Additional Comments: We do not have any objections for the proposed sale of County of Hawaii lands in Koholalele and Kapulena, Hamakua District, Hawaii.**
  
- ( ) Other: \_\_\_\_\_

Should you have any questions, please call Ms. Suzie S. Agraan of the Planning Branch at 587-0258.

Signed: \_\_\_\_\_

ERIC T. HIRANO, CHIEF ENGINEER

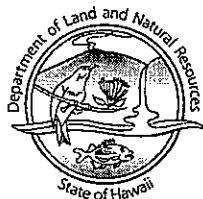
Date: \_\_\_\_\_

8/21/09

53370

LINDA LINGLE  
GOVERNOR OF HAWAII

LAURA H. THIELEN  
CHAIRPERSON  
BOARD OF LAND AND NATURAL RESOURCES  
COMMISSION ON WATER RESOURCE MANAGEMENT



DIVISION

2009 AUG 18 P 3:28

RECEIVED  
STATE PARKS DIV

STATE OF HAWAII  
DEPARTMENT OF LAND AND NATURAL RESOURCES  
LAND DIVISION SOURCES  
POST OFFICE BOX 621 HAWAII  
HONOLULU, HAWAII 96809

'09 AUG 12 A10:24

August 12, 2009

DEPT OF LAND &  
NATURAL RESOURCESMEMORANDUM

TO:

**DLNR Agencies:**

- ☒ Div. of Aquatic Resources
- ☒ Div. of Boating & Ocean Recreation
- ☒ Engineering Division
- ☒ Div. of Forestry & Wildlife
- ☒ Div. of State Parks
- ☒ Commission on Water Resource Management
- ☒ Office of Conservation & Coastal Lands
- ☒ Land Division - Hawaii District
- ☒ Historic Preservation

RECEIVED

SEP 02 2009

PBR HAWAII

FROM:

Morris M. Atta

SUBJECT:

Pre-consultation on environmental assessments for the sale of Hawaii County  
Hamakua lands

LOCATION: Island of Hawaii

APPLICANT: PBR Hawaii &amp; Associates, Inc. on behalf of County of Hawaii

Transmitted for your review and comment on the above referenced document. We would appreciate your comments on this document. Please submit any comments by September 1, 2009.

If no response is received by this date, we will assume your agency has no comments. If you have any questions about this request, please contact my office at 587-0433. Thank you.

## Attachments

- ☒ We have no objections.
- ☒ We have no comments.
- ☐ Comments are attached.

Signed:

Date:

*[Signature]*  
8/17/09



LINDA LINGLE  
GOVERNOR OF HAWAII

LAURA H. THIELEN  
CHAIRPERSON  
BOARD OF LAND AND NATURAL RESOURCES  
COMMISSION ON WATER RESOURCE MANAGEMENT



STATE OF HAWAII  
DEPARTMENT OF LAND AND NATURAL RESOURCES  
LAND DIVISION

POST OFFICE BOX 621  
HONOLULU, HAWAII 96809

September 5, 2009

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SEP 08 2009

PBR HAWAII

PBR Hawaii & Associates, Inc.  
1001 Bishop Street  
ASB Tower Suite 650  
Honolulu, Hawaii 96813-3484

Attention: Ms. Catie Fernandez, Planner

Ladies and Gentlemen:

Subject: Pre-Consultation for Environmental Assessments for the Sale of Hawaii  
County Hamakua Lands

Thank you for the opportunity to review and comment on the subject matter. The Department of Land and Natural Resources' (DLNR), Land Division distributed or made available a copy of your report pertaining to the subject matter to Division of Forestry & Wildlife for their review and comment.

The Department of Land and Natural Resources has no other comments to offer on the subject matter. Should you have any questions, please feel free to call our office at 587-0433. Thank you.

Sincerely,

*Charlene Ellnoie*  
for Morris M. Atta  
Administrator

LINDA LINGLE  
GOVERNOR OF HAWAII



LAURA H. THIELEN  
CHAIRPERSON  
BOARD OF LAND AND NATURAL RESOURCES  
COMMISSION ON WATER RESOURCE MANAGEMENT

RECEIVED  
LAND DIVISION

2009 SEP -3 P 2:41

STATE OF HAWAII  
DEPARTMENT OF LAND AND NATURAL RESOURCES  
LAND DIVISION

POST OFFICE BOX 621  
HONOLULU, HAWAII 96809

DEPT. OF LAND &  
NATURAL RESOURCES  
STATE OF HAWAII

August 12, 2009

RECEIVED

SEP 03 2009

PBR HAWAII

MEMORANDUM

TO: **DLNR Agencies:**  
☒ Div. of Aquatic Resources  
☒ Div. of Boating & Ocean Recreation  
☒ Engineering Division  
☒ Div. of Forestry & Wildlife  
☒ Div. of State Parks  
☒ Commission on Water Resource Management  
☒ Office of Conservation & Coastal Lands  
☒ Land Division -Hawaii District  
☒ Historic Preservation

FROM: *for* Morris M. Atta *M. Atta*  
SUBJECT: Pre-consultation on environmental assessments for the sale of Hawaii County Hamakua lands  
LOCATION: Island of Hawaii  
APPLICANT: PBR Hawaii & Associates, Inc. on behalf of County of Hawaii

Transmitted for your review and comment on the above referenced document. We would appreciate your comments on this document. Please submit any comments by September 1, 2009.

If no response is received by this date, we will assume your agency has no comments. If you have any questions about this request, please contact my office at 587-0433. Thank you.

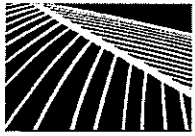
Attachments

☒ We have no objections.  
☐ We have no comments.  
☐ Comments are attached.

Signed:

Date: SEP - 2 2009

*Paul J. Conry*  
**PAUL J. CONRY, ADMINISTRATOR  
DIVISION OF FORESTRY AND WILDLIFE**



# PBR HAWAII

& ASSOCIATES, INC.

## PRINCIPALS

THOMAS S. WITTEN, ASLA  
*President*

R. STAN DUNCAN, ASLA  
*Executive Vice-President*

RUSSELL Y. J. CHUNG, FASLA, LEED® AP  
*Executive Vice-President*

VINCENT SHIGEKUNI  
*Vice-President*

GRANT T. MURAKAMI, AICP, LEED® AP  
*Principal*

W. FRANK BRANDT, FASLA  
*Chairman Emeritus*

## ASSOCIATES

TOM SCHNELL, AICP  
*Senior Associate*

RAYMOND T. HIGA, ASLA  
*Senior Associate*

KEVIN K. NISHIKAWA, ASLA  
*Associate*

KIMI MIKAMI YUEN, LEED® AP  
*Associate*

SCOTT ALIKA ABRIGO, LEED® AP  
*Associate*

SCOTT MURAKAMI, ASLA, LEED® AP  
*Associate*

DACHENG DONG, LEED® AP  
*Associate*

## HONOLULU OFFICE

1001 Bishop Street, Suite 650  
Honolulu, Hawai'i 96813-3484  
Tel: (808) 521-5631  
Fax: (808) 523-1402  
E-mail: sysadmin@pbrhawaii.com

## KAPOLEI OFFICE

1001 Kamokila Boulevard  
Kapolei Building, Suite 313  
Kapolei, Hawai'i 96707-2005  
Tel: (808) 521-5631  
Fax: (808) 535-3163

December 23, 2010

Morris M. Atta  
DLNR Land Division  
PO Box 621  
Honolulu, HI 96809

**SUBJECT: ENVIRONMENTAL ASSESSMENT FOR AN  
AGRICULTURAL PARK AT APPROXIMATELY 1,700  
ACRES OF HAWAII COUNTY LAND KAPULENA,  
HĀMĀKUA**

Dear Mr. Atta,

Thank you for your letter dated August 12, 2009 regarding the above referenced Draft Environmental Assessment. Through the pre-consultation process the project has evolved from the sale of the Kapulena lands to a partnership between the County, Hāmākua Farm Bureau, the Big Island Farm Bureau, Kamehameha Schools, the University of Hawai'i College of Agriculture and Forestry; the University of Hawai'i College of Tropical Agriculture and Human Resources; and The Kohala Center to develop an agricultural park. The new agricultural park will serve as the site for a pilot project to demonstrate best practices for sustainable and efficient grazing operations to benefit the grass-fed beef industry; as a test area for trials of orchard and other crops with potential for larger scale production; as an incubator and product handling area for trials of value-added agricultural products; and as a technical training site to help students learn cultivation, production, planning, marketing and business strategies for agricultural enterprises. The training component of the project is designed to establish and strengthen a family-farm based agricultural community in Hāmākua.

As the planning consultant for the applicant, County of Hawai'i, Department of Finance, we acknowledge the DLNR Land Division, Division of Boating and Ocean Recreation, Division of Forestry and Wildlife, Division of State Parks, Division of Aquatic Resources and the Commission on Water Resource Management have no comments at this time. We also acknowledge that the Engineering Division finds that the site is mapped on the Flood Insurance Rate Map (FIRM) as being in the Minimal Tsunami Inundation areas and Zone X and that the National Flood Insurance Program does not have any regulations for development within these zones.



**Mr. Morris Atta**

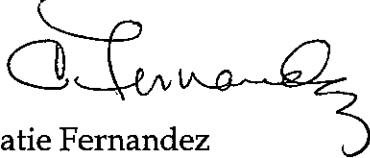
**ENVIRONMENTAL ASSESSMENT FOR AN AGRICULTURAL PARK AT  
APPROXIMATELY 1,700 ACRES OF HAWAII COUNTY LAND KAPULENA,  
HĀMĀKUA**

2 of 2

Thank you for contributing to the development of this document. Your comments will be included in the Draft Environmental Assessment.

Sincerely,

PBR HAWAII

A handwritten signature in black ink, appearing to read 'C. Fernandez', with a stylized flourish at the end.

Catie Fernandez  
Planner

cc: Kenneth Van Bergen, County of Hawai'i

O:\Job25\2506.19 Hawaii County-Hamakua Lands EA\EA\Pre-Consultation\Responses to Pre-Consultation  
Comments\Kapulena\DLNR\_CWRM-DOBOR-Parks-DAR-Eng.doc

LINDA LINGLE  
GOVERNOR OF HAWAII

LAURA H. THIELEN  
CHAIRPERSON  
BOARD OF LAND AND NATURAL RESOURCES  
COMMISSION ON WATER RESOURCE MANAGEMENT



STATE OF HAWAII  
DEPARTMENT OF LAND AND NATURAL RESOURCES  
LAND DIVISION

POST OFFICE BOX 621  
HONOLULU, HAWAII 96809

September 16, 2009

PBR Hawaii & Associates, Inc.  
1001 Bishop Street  
ASB Tower Suite 650  
Honolulu, Hawaii 96813-3484

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SEP 17 2009

PBR HAWAII

Attention: Ms. Catie Fernandez, Planner

Ladies and Gentlemen:

Subject: Pre-Consultation for Environmental Assessments for the Sale of Hawaii  
County Hamakua Lands

Thank you for the opportunity to review and comment on the subject matter. The Department of Land and Natural Resources' (DLNR), Land Division distributed or made available a copy of your report pertaining to the subject matter to State Historic Preservation Division for their review and comment.

The Department of Land and Natural Resources has no other comments to offer on the subject matter. Should you have any questions, please feel free to call our office at 587-0433. Thank you.

Sincerely,

  
for Morris M. Atta  
Administrator

LINDA LINGLE  
GOVERNOR OF HAWAII



STATE OF HAWAII  
DEPARTMENT OF LAND AND NATURAL RESOURCES

STATE HISTORIC PRESERVATION DIVISION  
601 KAMOKILA BOULEVARD, ROOM 555  
KAPOLEI, HAWAII 96707

LAURA H. THIELEN  
CHAIRPERSON  
BOARD OF LAND AND NATURAL RESOURCES  
COMMISSION ON WATER RESOURCE MANAGEMENT

RUSSELL Y. TSUJI  
FIRST DEPUTY

KEN C. KAWAHARA  
DEPUTY DIRECTOR - WATER

AQUATIC RESOURCES  
BOATING AND OCEAN RECREATION  
BUREAU OF CONVEYANCES  
COMMISSION ON WATER RESOURCE MANAGEMENT  
CONSERVATION AND COASTAL LANDS  
CONSERVATION AND RESOURCES ENFORCEMENT  
ENGINEERING  
FORESTRY AND WILDLIFE  
HISTORIC PRESERVATION  
KAHOOLAWE ISLAND RESERVE COMMISSION  
LAND  
STATE PARKS

September 10, 2009

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LOG NO: 2009.3286

DOC NO: 0909MD09

Archaeology

TO: Morris M. Atta  
DLNR Land Division

PBR HAWAII

FROM: Nancy McMahon, Deputy SHPO/State Archaeologist and Historic Preservation Manager

State Historic Preservation Division

*Nancy A. McMahon*

SUBJECT: Chapter 6E-8 Historic Preservation Review –  
Request for Pre-Consultation on Environmental Assessments for the Sale of Hawaii  
County Hamakua Lands (Total Acreage 2,779.807)  
Koholalele & Kapulena Ahupua'a, Hamakua District, Island of Hawai'i  
TMKs: (3) 4-2-005:001; 4-7-005:001-003; 4-7-006:001, 005-007, 010, 018 & 020

Thank you for the opportunity to comment on the aforementioned project, which we received on August 13, 2009. We regret that we were unable to meet your requested response date of September 1, 2009.

Much of these lands were previously part of the Honokaa Sugar Company plantation, and include documented water features and undocumented historic-era plantation features. We have no records of the land use prior to the historic sugar plantations, nor have any archaeological inventory survey-level reviews been completed for these areas.

We would like to recommend that a literature review and reconnaissance-level survey be conducted of these lands as part of the environmental assessment. In other areas of Hamakua we have also found that the consistent use over time of water ditch systems over time seems to have resulted in unique ecosystems not found elsewhere in the region.

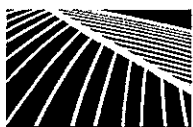
If you have questions about this letter please contact Morgan Davis at (808) 933-7650.

DEPT. OF LAND &  
NATURAL RESOURCES  
STATE OF HAWAII

2009 SEP 15 A 10:31

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LAND DIVISION





# PBR HAWAII

& ASSOCIATES, INC.

## PRINCIPALS

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*President*

R. STAN DUNCAN, ASLA  
*Executive Vice-President*

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*Executive Vice-President*

VINCENT SHIGEKUNI  
*Vice-President*

GRANT T. MURAKAMI, AICP, LEED® AP  
*Principal*

W. FRANK BRANDT, FASLA  
*Chairman Emeritus*

December 23, 2010

State Historic Preservation Officer  
State of Hawai'i  
DLNR – State Historic Preservation Division  
601 Kamokila Blvd., Room 555  
Kapolei, HI 96707

**SUBJECT: ENVIRONMENTAL ASSESSMENT FOR AN  
AGRICULTURAL PARK AT APPROXIMATELY 1,700  
ACRES OF HAWAII COUNTY LAND KAPULENA,  
HĀMĀKUA**

## ASSOCIATES

TOM SCHNELL, AICP  
*Senior Associate*

RAYMOND T. HIGA, ASLA  
*Senior Associate*

KEVIN K. NISHIKAWA, ASLA  
*Associate*

KIMI MIKAMI YUEN, LEED® AP  
*Associate*

SCOTT ALIKA ABRIGO, LEED® AP  
*Associate*

SCOTT MURAKAMI, ASLA, LEED® AP  
*Associate*

DACHENG DONG, LEED® AP  
*Associate*

Dear State Historic Preservation Officer,

Thank you for your letter dated September 10, 2009 regarding the above referenced Draft Environmental Assessment. Through the pre-consultation process the project has evolved from the sale of the Kapulena lands to a partnership between the County, Hāmākua Farm Bureau, the Big Island Farm Bureau, Kamehameha Schools, the University of Hawai'i College of Agriculture and Forestry; the University of Hawai'i College of Tropical Agriculture and Human Resources; and The Kohala Center to develop an agricultural park. The new agricultural park will serve as the site for a pilot project to demonstrate best practices for sustainable and efficient grazing operations to benefit the grass-fed beef industry; as a test area for trials of orchard and other crops with potential for larger scale production; as an incubator and product handling area for trials of value-added agricultural products; and as a technical training site to help students learn cultivation, production, planning, marketing and business strategies for agricultural enterprises. The training component of the project is designed to establish and strengthen a family-farm based agricultural community in Hāmākua.

As the planning consultant for the applicant, County of Hawai'i, Department of Finance, we acknowledge the comments from SHPD, indicating that the lands were previously part of sugar plantations and may include water features and historic-era plantation features. An Archaeological Inventory Survey for this property has been conducted and several historic-era features (rock mounds associated with field preparation) were identified, evaluated and inventoried. Additionally four pre-Contact era temporary habitation rock shelters were identified as was a rock structure that possibly is the remnants of a heiau.

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Fax: (808) 535-3163

State Historic Preservation Officer

**ENVIRONMENTAL ASSESSMENT FOR AN AGRICULTURAL PARK AT  
APPROXIMATELY 1,700 ACRES OF HAWAII COUNTY LAND KAPULENA,  
HĀMĀKUA**

2 of 2

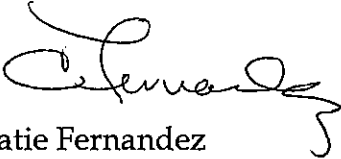
Mitigation proposed for the agricultural park is to avoid all rock shelters and the possible heiau site.

The Archaeological Inventory Survey will be included with the Draft Environmental Assessment and a copy of the DEA has been provided to your office for review.

Thank you for contributing to the development of this document. Your comments will be included in the Draft Environmental Assessment.

Sincerely,

PBR HAWAII

A handwritten signature in black ink, appearing to read 'C. Fernandez', with a stylized flourish at the end.

Catie Fernandez  
Planner

cc: Kenneth Van Bergen, County of Hawai'i

**William P. Kenoi**  
Mayor



**Darryl J. Oliveira**  
Fire Chief

**Glen P. I. Honda**  
Deputy Fire Chief

**County of Hawai'i**  
**HAWAII FIRE DEPARTMENT**  
25 Aupuni Street • Suite 103 • Hilo, Hawai'i 96720  
(808) 981-8394 • Fax (808) 981-2037

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AUG 17 2009

PBR HAWAII

August 13, 2009

Attention: Catie Fernandez  
PBR Hawai'i & Associations, Inc.  
1001 Bishop Street  
ASB Tower, Suite 650  
Honolulu, Hawai'i 96813-3484

Dear Ms. Fernandez,

**SUBJECT:** PRE-CONSULTATION ENVIRONMENTAL ASSESSMENT  
HAWAII COUNTY HAMAKUA LANDS (KOHOLALELE & KAPULENA)

The Hawai'i Fire Department does not have any comments to offer at this time regarding the above-referenced pre-consultation Environmental Assessment.

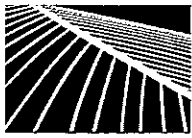
Thank you for the opportunity to comment.

Sincerely,

  
DARRYL OLIVEIRA  
Fire Chief

RP:lc





# PBR HAWAII

& ASSOCIATES, INC.

December 23, 2010

## PRINCIPALS

THOMAS S. WITTEN, ASLA  
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R. STAN DUNCAN, ASLA  
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*Executive Vice-President*

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*Associate*

DACHENG DONG, LEED® AP  
*Associate*

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1001 Kamokila Boulevard  
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Tel: (808) 521-5631  
Fax: (808) 535-3163

Darryl Oliveira, Chief  
Hawai'i Fire Department  
25 Aupuni Street, Suite 103  
Hilo, HI 96720

**SUBJECT: ENVIRONMENTAL ASSESSMENT FOR AN AGRICULTURAL  
PARK AT APPROXIMATELY 1,700 ACRES OF HAWAII  
COUNTY LAND KAPULENA, HĀMAKUA**

Dear Chief Oliveria,

Thank you for your letter dated August 13, 2009 regarding the above referenced Draft Environmental Assessment. Through the pre-consultation process the project has evolved from the sale of the Kapulena lands to a partnership between the County, Hāmākua Farm Bureau, the Big Island Farm Bureau, Kamehameha Schools, the University of Hawai'i College of Agriculture and Forestry; the University of Hawai'i College of Tropical Agriculture and Human Resources; and The Kohala Center to develop an agricultural park. The new agricultural park will serve as the site for a pilot project to demonstrate best practices for sustainable and efficient grazing operations to benefit the grass-fed beef industry; as a test area for trials of orchard and other crops with potential for larger scale production; as an incubator and product handling area for trials of value-added agricultural products; and as a technical training site to help students learn cultivation, production, planning, marketing and business strategies for agricultural enterprises. The training component of the project is designed to establish and strengthen a family-farm based agricultural community in Hāmākua.

As the planning consultant for the applicant, County of Hawai'i, Department of Finance, we acknowledge that the Hawai'i Fire Department has no comments at this time.

Thank you for contributing to the development of this document. Your comments will be included in the Draft Environmental Assessment.

Sincerely,

PBR HAWAII

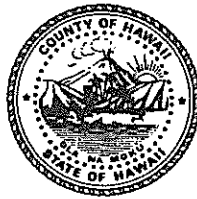
Catie Fernandez  
Planner

cc: Kenneth Van Bergen, County of Hawai'i

O:\Job25\2506.19 Hawaii County-Hamakua Lands EA\EA\Pre-Consultation\Responses to Pre-Consultation  
Comments\Kapulena\HFD.doc



**William P. Kenoi**  
*Mayor*



**Harry S. Kubojiri**  
*Police Chief*

**Paul K. Ferreira**  
*Deputy Police Chief*

## County of Hawaii

### POLICE DEPARTMENT

349 Kapiolani Street • Hilo, Hawaii 96720-3998  
(808) 935-3311 • Fax (808) 961-8865

August 12, 2009

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AUG 13 2009

PBR HAWAII

Ms. Catie Fernandez, Planner  
PBR Hawaii & Associates  
1001 Bishop Street  
ASB Tower, Suite 650  
Honolulu, HI 96813-3184

Dear Ms. Fernandez:

SUBJECT: ENVIRONMENTAL ASSESSMENTS FOR THE SALE OF HAWAII  
COUNTY HAMAKUA LANDS (KOHOLALELE & KAPULENA) -  
PRECONSULTATION

Staff, upon reviewing the provided documents and visiting the proposed site,  
does not anticipate any significant impact to traffic and/or public safety concerns.

Thank you for allowing us the opportunity to comment.

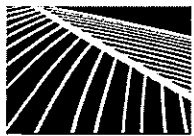
If you have any questions, please contact Captain Randy Apele, Commander of  
the Hamakua District, at 775-7533.

Sincerely,

A handwritten signature in black ink, appearing to read "Derek D. Pacheco".

DEREK D. PACHECO  
ASSISTANT POLICE CHIEF  
AREA I OPERATIONS BUREAU

RA:lli



# PBR HAWAII

& ASSOCIATES, INC.

December 23, 2010

## PRINCIPALS

THOMAS S. WITTEN, ASLA  
*President*

R. STAN DUNCAN, ASLA  
*Executive Vice-President*

RUSSELL Y. J. CHUNG, FASLA, LEED® AP  
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GRANT T. MURAKAMI, AICP, LEED® AP  
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W. FRANK BRANDT, FASLA  
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SCOTT ALIKA ABRIGO, LEED® AP  
*Associate*

SCOTT MURAKAMI, ASLA, LEED® AP  
*Associate*

DACHENG DONG, LEED® AP  
*Associate*

## HONOLULU OFFICE

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E-mail: sysadmin@pbrhawaii.com

## KAPOLEI OFFICE

1001 Kamokila Boulevard  
Kapolei Building, Suite 313  
Kapolei, Hawai'i 96707-2005  
Tel: (808) 521-5631  
Fax: (808) 535-3163

Derek D. Pacheco, Assistant Police Chief  
County of Hawai'i Police Department  
349 Kapiolani Street  
Hilo, HI 96720-3998

**SUBJECT: ENVIRONMENTAL ASSESSMENT FOR AN AGRICULTURAL  
PARK AT APPROXIMATELY 1,700 ACRES OF HAWAII  
COUNTY LAND KAPULENA, HĀMĀKUA**

Dear Assistant Chief Pacheco,

Thank you for your letter dated August 12, 2009 regarding the above referenced Draft Environmental Assessment. Through the pre-consultation process the project has evolved from the sale of the Kapulena lands to a partnership between the County, Hāmākua Farm Bureau, the Big Island Farm Bureau, Kamehameha Schools, the University of Hawai'i College of Agriculture and Forestry; the University of Hawai'i College of Tropical Agriculture and Human Resources; and The Kohala Center to develop an agricultural park. The new agricultural park will serve as the site for a pilot project to demonstrate best practices for sustainable and efficient grazing operations to benefit the grass-fed beef industry; as a test area for trials of orchard and other crops with potential for larger scale production; as an incubator and product handling area for trials of value-added agricultural products; and as a technical training site to help students learn cultivation, production, planning, marketing and business strategies for agricultural enterprises. The training component of the project is designed to establish and strengthen a family-farm based agricultural community in Hāmākua.

As the planning consultant for the applicant, County of Hawai'i, Department of Finance, we acknowledge that the Police Department does not anticipate any significant impact to traffic or any public safety concerns.

Thank you for contributing to the development of this document. Your comments will be included in the Draft Environmental Assessment.

Sincerely,

PBR HAWAII

Catie Fernandez  
Planner

cc: Kenneth Van Bergen, County of Hawai'i

O:\Job25\2506.19 Hawaii County-Hamakua Lands EA\EA\Pre-Consultation\Responses to Pre-Consultation  
Comments\Kapulena\HPD.doc

LINDA LINGLE  
Governor of Hawai'i



KATHERINE PUANA KEALOHA  
Director

STATE OF HAWAII  
OFFICE OF ENVIRONMENTAL QUALITY CONTROL

Department of Health  
235 South Beretania Street  
Leiopapa A Kamehameha, Suite 702  
Honolulu, Hawai'i 96813

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AUG 27 2009

PBR HAWAII

Telephone (808) 586-4185  
Facsimile (808) 586-4186  
Electronic Mail: [oeqc@doh.hawaii.gov](mailto:oeqc@doh.hawaii.gov)

August 25, 2009

Catie Fernandez  
PBR Hawai'i & Associates, Inc.  
1001 Bishop Street  
ASB Tower, Suite 650  
Honolulu, Hawai'i 96813-3484

Subject: Environmental Assessment for the sale of Hawai'i County Hāmākua  
Lands (Koholālele & Kapulena) – Preconsultation

Dear Ms. Fernandez,

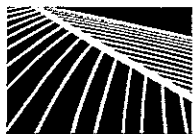
Thank you for the opportunity to provide comments regarding the proposed subject action. Your letter of August 7, 2009, does not contain information about activities that will occur on the lands once the sale is final. Therefore, the Office of Environmental Quality Control does not have adequate information to provide comments at this stage.

However, we recommend that you address the primary and secondary impacts of projected activities that will be conducted on the lands after the sale.

Sincerely,

A handwritten signature in black ink, appearing to read "Katherine Puana Kealoha".

Katherine Puana Kealoha  
Director



# PBR HAWAII

& ASSOCIATES, INC.

December 23, 2010

## PRINCIPALS

THOMAS S. WITTEN, ASLA  
*President*

R. STAN DUNCAN, ASLA  
*Executive Vice-President*

RUSSELL Y. J. CHUNG, FASLA, LEED® AP  
*Executive Vice-President*

VINCENT SHIGEKUNI  
*Vice-President*

GRANT T. MURAKAMI, AICP, LEED® AP  
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*Chairman Emeritus*

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SCOTT ALIKA ABRIGO, LEED® AP  
*Associate*

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*Associate*

DACHENG DONG, LEED® AP  
*Associate*

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Kapolei, Hawaii 96707-2005  
Tel: (808) 521-5631  
Fax: (808) 535-3163

Herman Tuiolosega, Acting Director  
State of Hawai'i, Office of Environmental Quality Control  
235 S. Beretania Street, Suite 702  
Honolulu, HI 96813

**SUBJECT: ENVIRONMENTAL ASSESSMENT FOR AN AGRICULTURAL  
PARK AT APPROXIMATELY 1,700 ACRES OF HAWAII  
COUNTY LAND KAPULENA, HĀMĀKUA**

Dear Mr. Tuiolosega,

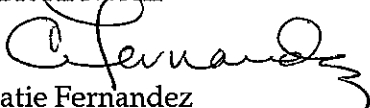
Thank you for your office's letter dated August 25, 2009 regarding the above referenced Draft Environmental Assessment. Through the pre-consultation process the project has evolved from the sale of the Kapulena lands to a partnership between the County, Hāmākua Farm Bureau, the Big Island Farm Bureau, Kamehameha Schools, the University of Hawai'i College of Agriculture and Forestry; the University of Hawai'i College of Tropical Agriculture and Human Resources; and The Kohala Center to develop an agricultural park. The new agricultural park will serve as the site for a pilot project to demonstrate best practices for sustainable and efficient grazing operations to benefit the grass-fed beef industry; as a test area for trials of orchard and other crops with potential for larger scale production; as an incubator and product handling area for trials of value-added agricultural products; and as a technical training site to help students learn cultivation, production, planning, marketing and business strategies for agricultural enterprises. The training component of the project is designed to establish and strengthen a family-farm based agricultural community in Hāmākua.

As the planning consultant for the applicant, County of Hawai'i, Department of Finance, we acknowledge the comments from OEQC recommending evaluation of the impacts of projected activities that will be conducted on the site after the sale. Potential impacts associated with the agricultural park will be discussed in the Draft Environmental Assessment.

Thank you for contributing to the development of this document. Your comments will be included in the Draft Environmental Assessment.

Sincerely,

PBR HAWAII

  
Catie Fernandez  
Planner

cc: Kenneth Van Bergen, County of Hawai'i

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**STATE OF HAWAII**  
**OFFICE OF HAWAIIAN AFFAIRS**  
711 KAPI'OLANI BOULEVARD, SUITE 500  
HONOLULU, HAWAII 96813

HRD09/4607

PBR HAWAII

SEP 03 2009

RECEIVED

September 1, 2009

Catie Fernandez  
PBR Hawaii & Associates Inc.  
Honolulu Office  
1001 Bishop Street  
ASB Tower, Suite 650  
Honolulu, HI 96813-3484

**RE: Pre-consultation for the Environmental Assessments for the sale of Hawai'i County lands in Hāmākua (Koholālele & Kapulena). TMK: (3) 4-2-005: 001, (3) 4-7-005: 001, 002 and 003; (3) 4-7-006: 001, 005, 006, 007, 010, 018 and 020.**

Aloha e Catie Fernandez,

The Office of Hawaiian Affairs (OHA) is in receipt of your letter requesting comments on the above-mentioned project. The County of Hawai'i is considering selling some 2,780 acres of land in Koholālele and Kapulena, Hāmākua, Hawai'i Island. OHA has reviewed the project and offers the following comments.

The Draft Environmental Assessment (DEA) must include some sort of cultural impact assessment (CIA), in accordance with Act 50, Session Laws of Hawai'i, 2000. The Hawai'i State Legislature, through Act 50, stated that "the past failure to require native Hawaiian cultural impact assessments has resulted in the loss and destruction of many important cultural resources and has interfered with the exercise of native Hawaiian culture." At the very least, interviews with cultural practitioners in the area should be conducted for the CIA. Our community resource coordinators on Hawai'i Island can assist you with locating suitable interviewees. They can be reached at 920-6418 (Hilo Office) and 327-9525 (Kona Office).

OHA requests clarification whether an archaeological inventory survey for the project will be submitted to the State Historic Preservation Division for review and approval. If so, OHA should be allowed the opportunity to comment on the criteria assigned to any cultural or archaeological sites identified within the archaeological inventory survey.


Furthermore, OHA has questions about the Ceded Lands status of the parcels the county is proposing to sell. Ceded Lands hold a considerable amount of sentimental, historical and legal significance for Native Hawaiians and OHA. These lands were illegally taken from the Hawaiian Kingdom after the 1893 overthrow and later transferred ("ceded") by the United States government to the State of Hawai'i upon statehood. Today, the state holds the Ceded Lands corpus in trust for Native Hawaiians and the general public.

The Ceded Lands status of parcels are often obscured over time as parcels are consolidated or subdivided. OHA requests assurances that none of the parcels the county proposes to sell are Ceded Lands. To this end, we ask that the DEA contain detailed histories of each parcel, and whether at any point they have been consolidated or subdivided.

If any of these parcels are in fact Ceded Lands, the proposed sale of such lands must comply with Act 176, Session Laws of Hawaii 2009. OHA has strong concerns about any transaction that would result in the depletion of the Ceded Lands corpus, as Native Hawaiians still have unrelinquished claims to those lands.

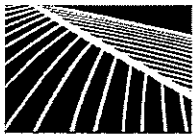
Thank you for the opportunity to comment. If you have further questions, please contact Sterling Wong by phone at (808) 594-0248 or e-mail him at [sterlingw@oha.org](mailto:sterlingw@oha.org).

'O wau iho nō me ka 'oia'i'o,



Clyde W. Nāmu'o  
Administrator

C: OHA Hilo and Kona CRC Office



# PBR HAWAII

& ASSOCIATES, INC.

## PRINCIPALS

THOMAS S. WITTEN, ASLA  
*President*

R. STAN DUNCAN, ASLA  
*Executive Vice-President*

RUSSELL Y. J. CHUNG, FASLA, LEED® AP  
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VINCENT SHIGEKUNI  
*Vice-President*

GRANT T. MURAKAMI, AICP, LEED® AP  
*Principal*

W. FRANK BRANDT, FASLA  
*Chairman Emeritus*

December 23, 2010

Clyde W. Nāmu'o, Administrator  
State of Hawai'i, Office of Hawaiian Affairs  
711 Kapi'olani Blvd., Suite 500  
Honolulu, HI 96813

**SUBJECT: ENVIRONMENTAL ASSESSMENT FOR AN  
AGRICULTURAL PARK AT APPROXIMATELY 1,700  
ACRES OF HAWAII COUNTY LAND KAPULENA,  
HĀMĀKUA**

## ASSOCIATES

TOM SCHNELL, AICP  
*Senior Associate*

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*Associate*

SCOTT MURAKAMI, ASLA, LEED® AP  
*Associate*

DACHENG DONG, LEED® AP  
*Associate*

Dear Mr. Nāmu'o,

Thank you for your letter dated September 1, 2009 regarding the above referenced Draft Environmental Assessment. Through the pre-consultation process the project has evolved from the sale of the Kapulena lands to a partnership between the County, Hāmākua Farm Bureau, the Big Island Farm Bureau, Kamehameha Schools, the University of Hawai'i College of Agriculture and Forestry; the University of Hawai'i College of Tropical Agriculture and Human Resources; and The Kohala Center to develop an agricultural park. The new agricultural park will serve as the site for a pilot project to demonstrate best practices for sustainable and efficient grazing operations to benefit the grass-fed beef industry; as a test area for trials of orchard and other crops with potential for larger scale production; as an incubator and product handling area for trials of value-added agricultural products; and as a technical training site to help students learn cultivation, production, planning, marketing and business strategies for agricultural enterprises. The training component of the project is designed to establish and strengthen a family-farm based agricultural community in Hāmākua.

As the planning consultant for the applicant, County of Hawai'i, Department of Finance, we acknowledge the comments from The Office of Hawaiian Affairs requesting that a Cultural Impact Assessment, an Archaeological Inventory Survey and research into the status of each parcel be performed. The Draft Environmental Assessment includes a Cultural Impact Assessment, an Archaeological Inventory Survey and research into the status of the parcels proposed for the agricultural park.

**HONOLULU OFFICE**  
1001 Bishop Street, Suite 650  
Honolulu, Hawai'i 96813-3484  
Tel: (808) 521-5631  
Fax: (808) 523-1402  
E-mail: sysadmin@pbrhawaii.com

**KAPOLEI OFFICE**  
1001 Kamokila Boulevard  
Kapolei Building, Suite 313  
Kapolei, Hawai'i 96707-2005  
Tel: (808) 521-5631  
Fax: (808) 535-3163

Mr. Clyde Nāmu‘o

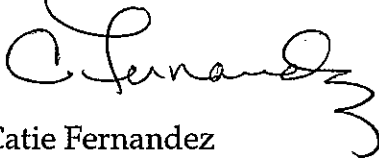
**ENVIRONMENTAL ASSESSMENT FOR AN AGRICULTURAL PARK AT  
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HĀMĀKUA**

2 of 2

Thank you for contributing to the development of this document. Your comments will be included in the Draft Environmental Assessment.

Sincerely,

PBR HAWAII

A handwritten signature in black ink, appearing to read "C. Fernandez", with a stylized flourish at the end.

Catie Fernandez  
Planner

cc: Kenneth Van Bergen, County of Hawai'i





# DEPARTMENT OF BUSINESS, ECONOMIC DEVELOPMENT & TOURISM

LINDA LINGLE  
GOVERNOR  
THEODORE E. LIU  
DIRECTOR  
MARK K. ANDERSON  
DEPUTY DIRECTOR  
ABBEY SETH MAYER  
DIRECTOR  
OFFICE OF PLANNING

## OFFICE OF PLANNING

235 South Beretania Street, 6th Floor, Honolulu, Hawaii 96813  
Mailing Address: P.O. Box 2359, Honolulu, Hawaii 96804

Telephone: (808) 587-2846  
Fax: (808) 587-2824

Ref. No. P-12751

September 8, 2009

RECEIVED

SEP 09 2009

PBR HAWAII

Ms. Catie Fernandez  
PBR Hawaii & Associates, Inc.  
1001 Bishop Street  
ASB Tower, Suite 650  
Honolulu, Hawaii 96813-3484

Dear Ms. Fernandez:

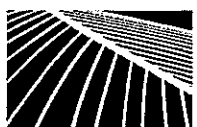
Subject: Sale of Hawaii County Hamakua Lands (Koholalele & Kapulena)  
Pre-consultation for Environmental Assessments  
TMK(s): 4-2-005: 1; 4-7-005: 1, 2, 3; 4-7-006: 1, 5, 6, 7, 10, 18, 20  
Koholalele & Kapulena, Hamakua, Island of Hawaii

Thank you for sending the Office of Planning (OP) a pre-consultation request regarding Environmental Assessments (EA) for the above referenced proposed sale of land on the Hamakua Coast of the island of Hawaii. The lots are zoned A-40a by the County of Hawaii, and are within the Agricultural or Conservation State land use districts. We note that your letter indicates that no State land use reclassification is proposed, nor is any development planned other than what is permitted according to the current zoning and State Land Use Districts. Therefore, OP has no comments at this time. In so stating, the Office offers no judgment of either the adequacy of the document itself or the merits of the proposed sale.

If you have any questions, please contact Lorene Maki of our Land Use Division at 587-2888.

Sincerely,

Abbey Seth Mayer  
Director



# PBR HAWAII & ASSOCIATES, INC.

## PRINCIPALS

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Kapolei, Hawai'i 96707-2005  
Tel: (808) 521-5631  
Fax: (808) 535-3163

December 23, 2010

Abbey Seth Mayer, Director  
State of Hawai'i  
DBEDT, Office of Planning  
PO Box 2359  
Honolulu, HI 96804

**SUBJECT: ENVIRONMENTAL ASSESSMENT FOR AN  
AGRICULTURAL PARK AT APPROXIMATELY 1,700  
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HĀMĀKUA**

Dear Mr. Mayer,

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As the planning consultant for the applicant, County of Hawai'i, Department of Finance, we acknowledge we acknowledge the comments from the Office of Planning confirming that the site is zoned A-40a and within the Agricultural State Land Use District. We further confirm that no State Land Use reclassification is proposed for the proposed agricultural park.

Mr. Abbey Seth Mayer

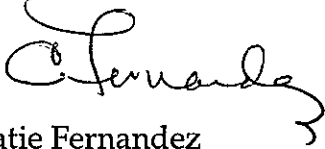
**ENVIRONMENTAL ASSESSMENT FOR AN AGRICULTURAL PARK AT  
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Sincerely,

PBR HAWAII

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Catie Fernandez  
Planner

cc: Kenneth Van Bergen, County of Hawai'i